

UH
4564
1878

REPORT

OF A

BOARD OF OFFICERS

TO DECIDE UPON A PATTERN OF

AMBULANCE WAGON

FOR

ARMY USE.



BOARD CONVENED BY SPECIAL ORDERS No. 44, WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE, WASHINGTON, MARCH 16, 1875.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1878.

UH U56r 1878

62550190R



NLM 05099629 8

NATIONAL LIBRARY OF MEDICINE

ARMY MEDICAL LIBRARY
FOUNDED 1836



WASHINGTON, D.C.

RETURN TO
NATIONAL LIBRARY OF MEDICINE
BEFORE LAST DATE SHOWN

JAN 7 1985
(578)

U.S. Adjutant General's Office

REPORT

OF A

BOARD OF OFFICERS

TO DECIDE UPON A PATTERN OF

AMBULANCE WAGON

FOR

ARMY USE.



BOARD CONVENED BY SPECIAL ORDERS No. 44, WAR DEPARTMENT, ADJUTANT-
GENERAL'S OFFICE, WASHINGTON, MARCH 16, 1875.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1878.

uH
U56r
1878

WASHINGTON, D. C., *March 15, 1878.*

SIR: I have the honor to forward the preliminary correspondence which led to the organization, in March, 1875, of a Board of Officers to decide on a pattern of ambulance wagon for Army use, together with the minutes of the proceedings of the Board, its preliminary report, correspondence, and specifications and drawings of the different plans discussed, and of the pattern finally decided on.

I am, sir, very respectfully, your obedient servant,

T. L. CRITTENDEN,

Colonel Seventeenth Infantry, President of the Board.

The Honorable SECRETARY OF WAR.

MINUTES

OF THE

PROCEEDINGS OF A BOARD OF OFFICERS CONVENED IN OBEDIENCE TO SPECIAL ORDERS NO. 44, WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE, WASHINGTON, MARCH 16, 1875.

The following is a copy of the order convening the Board:

[Special Orders No. 44.]

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
Washington, March 16, 1875.

[EXTRACT.]

* * * * *

4. A Board of officers, to consist of Col. Rufus Ingalls, Assistant Quartermaster-General, Maj. Alexander Chambers, Fourth Infantry, and Assistant Surgeon George A. Otis, is appointed to meet in this city on the 1st day of April, 1875, or as soon thereafter as practicable, to decide upon the pattern and prepare specifications for the ambulance for Army use.

The Quartermaster-General and Surgeon-General will lay before the Board all information in their offices on the subject of ambulances.

The junior member of the Board will act as Recorder.

By order of the Secretary of War.

(Signed)

E. D. TOWNSEND,
Adjutant-General.

On April 1, the two junior members of the Board met and received a communication from the President of the Board, stating that it would be impracticable for him to be in Washington until April 5, and it was decided that a formal meeting should be had on that date.

On Monday, April 5, the Board assembled at the Quartermaster-General's Office, at 11 a. m., all the members being present.

The President laid before the Board a communication from Lieut. Charles Braden, Seventh Cavalry, accompanied by a drawing of an improvised ambulance wagon, and a letter from Deputy Quartermaster-General James A. Ekin, lieutenant-colonel United States Army. (Appendix 1.)

The Quartermaster-General sent to the Board a "Treatise

on Military Carriages and other manufactures of the Royal Carriage Department, Great Britain," and—

- 1st. Printed specifications for two-wheeled ambulance, Finley and Coolidge patterns.
- 2d. Tripler's four-horse ambulance wagon.
- 3d. The new Coolidge ambulance.
- 4th. The four-wheeled two-horse ambulance wagon known as the Wheeling pattern.
- 5th. That known as the Rucker pattern.
- 6th. Specifications for the ambulance prepared at Jeffersonville, under authority of the Quartermaster's Department of January 25, 1875. (Appendix 2.)

The Quartermaster-General also laid before the Board a model of an ambulance body by the late General J. C. McFerran, and invited attention to the patterns of different wheels submitted to the Quartermaster's Department by different manufacturers, especially that made by the Davis Metallic Wheel Manufacturing Company, 80 Broadway, New York City.

The Surgeon-General laid before the Board drawings of the Finley, Coolidge, Wheeling, Moses, Sanger, and Confederate ambulance wagons; also an illustrated book, by Professor Gurlt, of Berlin, on transportation of the wounded; treatises on ambulance wagons, by Professor Longmore, of the British Military Medical School, by Prof. H. Fischer, of Breslau, by Prof. Leon Le Fort, of Paris, and an elaborate report on the subject by a British commission under the presidency of Inspector-General R. Lawson. The Surgeon-General also sent plans and descriptions of the following ambulance wagons, viz, those of Baron Mundy, Messrs. Robertson, Locati, Evans, Howard, and of that adopted for the Swiss service.

After an examination of the documentary and printed data presented for the consideration of the Board, the members agreed that the most serviceable and suitable ambulance wagon for the United States Army service would be a four-wheeled vehicle, light enough to be drawn by two horses, the driver being seated on the box, and that a wagon approximating in construction to those known as the Wheeling and Rucker

patterns, with such modifications as experience has suggested, should be the main object of consideration.

The Board then adjourned, to meet at noon, April 6, 1875.

(Signed)

RUFUS INGALLS,

Colonel and Assistant Quartermaster-General U. S. Army,

President of the Board.

(Signed)

GEORGE A. OTIS,

Assistant Surgeon U. S. Army, Recorder.

APRIL 6, 1875.

The Board assembled at the Quartermaster-General's Office, all the members being present.

The minutes of the proceedings of the first meeting were read and approved.

Models of the Wheeling and Rucker patterns of ambulance wagons, sent from the Army Medical Museum, by the Surgeon-General, were examined, and the modifications that might be desirable were discussed.

The question of the best form of springs was considered, and it was concluded that the platform springs were preferable to the elliptical form, commonly adopted in the Wheeling wagons.

It was noted that the "goose neck" attached to the pole of the "Rucker pattern," providing for the employment of an extra pair of horses on bad roads, was important, and should not be omitted on the poles of the ambulance wagons to be constructed.

The subject of the practicability of constructing the body of the wagon so that the fore-wheels should traverse, and permit the vehicle to make abrupt turns, or "turn on its own ground," without diminishing the diameter of the fore-wheels so far as to interfere seriously with the traction of the wagon, was then considered. The senior members of the Board were of opinion that it was inadvisable to raise the body sufficiently to permit fore-wheels of sufficient radius to pass underneath, without curving and thereby breaking the coupling at the very point where strength is most requisite: various points of

detail regarding the running-gear were then examined and discussed.

The President instructed the junior member of the Board to ascertain the weight of the ambulance wagon now building at Allegheny City, and of such other ambulance wagons as have been particularly commended officially.

The agent of the Davis Metallic Wheel Manufacturing Company, 80 Broadway, New York, was then introduced, to describe the models of the wheel and axle submitted by those patentees, and referred to in a letter of the Quartermaster-General of April 2, 1875. (Appendix 3.) The model exhibited was designed for a buggy wagon. The materials, component parts, and the modes of putting together, and of repairing the hubs, felloes, spokes, and tires, were minutely explained. The agent described the theoretical and practical tests to which this wheel had been subjected. Wheels of this pattern, of the light wheel exhibited, had been used over the pavements of New York City for a year or more, without need of repair. The facility with which the spokes, felloes, and hubs could be repaired or replaced was insisted on. The axle, weighing nine pounds, was examined. It was stated by the agent that the light wheel exhibited could be attached to a vehicle weighing only one hundred-weight, which, experimentally had been shown capable of carrying ten hundred pounds.

After the examination of the Davis wheel, the Board resumed the consideration of the details of construction of the two-horse, four-wheeled ambulances, and then adjourned.

Signed)

RUFUS INGALLS,

Colonel and Assistant Quartermaster-General U. S. A.,

President of the Board.

(Signed)

GEORGE A. OTIS,

Assistant Surgeon U. S. A. Recorder.

APRIL 9, 1875.

The Board reconvened this day, imperative business having necessitated the absence of the President on the 7th and 8th instants.

The Recorder read notes and telegram from Colonel Ingalls and Major Chambers, regarding the future proceedings.

The Recorder presented a memorandum of the weights of the several ambulance wagons commended by different commissions. (Appendix 4.)

There were received from the Surgeon-General, photographs, transmitted through Dr. Nicolaysen, of Christiania, of ambulance wagons used in Sweden and Norway. An atlas on conveyances for the wounded, by Dr. Van Donmelen, of Holland, and a number of miscellaneous plans and drawings of ambulance wagons, were also transmitted from the library of the Surgeon-General's Office. A letter was received from Major Ludington, stating that the Rucker ambulance wagon, exhibited at the Paris Exposition, had been sent for storage at the Philadelphia depot, and that there were two ambulance wagons of older patterns at the depot quartermaster's office in Washington.

A telegram (Appendix 5) was received from the Pittsburgh Wagon Works, giving weight of the ambulance wagon in process of construction there as between eight and nine hundred pounds.

Models of six wooden wheels, some of them with iron hubs, were submitted by the Quartermaster's Department, and were examined by the Board. They were regarded as unsuitable for the object in contemplation, being designed for heavy transportation wagons.

The Board then resumed the examination of the specifications of the later forms of two-horse four-wheeled ambulance wagons conforming more or less nearly to the patterns known as the Wheeling and Rucker pattern, and to that now under preparation at Alleghany City.

A revised copy of the specification (Appendix 6) for the latter vehicle was received from the Quartermaster's Department, in which a number of important alterations in the interior fittings and in the running-gear were noted.

It was agreed that some approximation to the ambulance wagon in question would be the most serviceable for general use in the United States Army, but that there were a number of further alterations regarded as of importance by the Board.

It was concluded that these alterations could be most readily pointed out when the experimental wagon now under construction should be completed and inspected by the Board.

The President then declared the Board adjourned, subject to his call, at such date as the Recorder might notify him that the ambulance wagon at Alleghany City was ready for inspection.

(Signed)

RUFUS INGALLS,

Col. and Asst. Quartermaster-General U. S. A., President.

(Signed)

GEORGE A. OTIS,

Assistant Surgeon U. S. A., Recorder.

WASHINGTON, May 21, 1875.

The Board convened this day at the office of the Quartermaster-General, at 11 a. m., pursuant to the call of the President. All of the members were present.

The minutes of the last meeting were read and approved.

The Recorder presented a number of communications relating to the merits of different hubs and wheels (Appendix 7) that had been received since the last meeting, and sundry memoranda regarding the weight of different ambulance wagons (Appendix 8), the variety of models on exhibition at the Patent Office, and of various specifications of bodies and running-gear of ambulance wagons approved by commissions of the English, French, and German Governments, that had been examined by the members of the Board since the last communication. Also letters from the Quartermaster-General, transmitting plans and drawings of ambulance to be constructed at Alleghany City, and calling attention to the vehicles constructed by the Kimball Carriage and Car Manufacturing Company (Appendix 9).

The specifications for the construction of an ambulance wagon to be recommended by the Board were then considered *seriatim*, and after some alterations were unanimously approved.

An informal note from the Ordnance Department, offering to have prepared such models as the Board might require, was

presented. It was decided that a preliminary report should be made to the Secretary of War, describing the form of ambulance wagon approved by the Board, and recommending that the Ordnance Department be instructed to prepare several models of this description, and also a number of experimental ambulance wagons of full size; two at least with wooden wheels, one with wheels of the Sarven patent, and one with iron wheels and axles of the Davis patent; and that the officers composing the Board should be ordered to resume their several stations and duties, subject to a call to reconvene from the President of the Board when the experimental vehicles shall be reported by the Ordnance Department as in readiness for inspection, at such time and place as may be most convenient for the interests of the service, with a view of completing the formal and final report.

The Board then adjourned.

(Signed) RUFUS INGALLS,
Col. and Asst. Quartermaster-General U. S. A., President.

(Signed) GEORGE A. OTIS,
Assistant Surgeon U. S. A., Recorder.

WASHINGTON, May 24, 1875.

The Board met, and the rough draught of the preliminary report agreed upon was read and adopted. A copy of that report is annexed.

The Board adjourned, subject to the call of the President.

(Signed) RUFUS INGALLS,
Col. and Asst. Quartermaster-General U. S. A., President.

(Signed) GEORGE A. OTIS,
Assistant Surgeon U. S. A., Recorder of the Board.

WASHINGTON, D. C., May 28, 1875.

GENERAL: I am directed by the President of the Board of Officers convened by Special Orders No. 44, par. 4, War Department, March 16, 1875, to transmit to the Secretary of War the inclosed preliminary report, together with specifications for the construction of experimental ambulance wagons, which it is advised should be built under the supervision of the officers of the Ordnance Department.

I am, sir, very respectfully, your obedient servant,
 (Signed) GEORGE A. OTIS,
Assistant Surgeon U. S. A., Recorder.

The ADJUTANT-GENERAL OF THE ARMY.

PRELIMINARY REPORT OF A BOARD OF OFFICERS CONVENED BY SPECIAL ORDERS NO. 44, WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE, WASHINGTON, MARCH 16, 1875.

A Board of officers assembled in Washington April 5, 1875, in conformity with the instructions of the fourth paragraph of Special Orders No. 44, A. G. O., March 16, 1875, embodied in the following:

[Special Orders No. 44.]

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
Washington, March 16, 1875.

[EXTRACT.]

* * * * *

4. A Board of officers, to consist of Col. Rufus Ingalls, Assistant Quartermaster-General; Maj. Alexander Chambers, Fourth Infantry; and Assistant Surgeon George A. Otis, is appointed to meet in this city on the 1st day of April, 1875, or as soon thereafter as practicable, to decide upon the pattern and prepare specifications for the ambulance for Army use.

The Quartermaster-General and Surgeon-General will lay before the Board all informations in their offices on the subject of ambulances.

The junior member of the Board will act as Recorder.

* * * * *

By order of the Secretary of War.

(Signed)

E. D. TOWNSEND,
Adjutant-General.

Official:

L. H. PELOUZE,

Assistant Adjutant-General.

There were laid before the Board, by the Quartermaster-General and the Surgeon-General, various official reports and unofficial treatises on carriages for the transport of the sick and wounded, with drawings, models, and printed specifications of many ambulance wagons that had been brought to the attention of the United States Government, or recommended by commissions appointed by foreign governments. The Board refused to entertain the propositions for one-horse hospital carts with two wheels, and the cumbrous four-horse wagons, designed to convey a large number of men in the recumbent posture, and agreed that a two-horse, four-wheeled wagon, approximating the pattern used during the war, with such modifications as experience has dictated, should be the object of deliberation.

On the following day, April 6, 1875, the Board reassembled, and discussed the details of construction of the body and running-gear of such a vehicle as would best fulfill the requirements for ambulance service in this country. It was decided to discard the second tier of litters heretofore recommended; to prepare specifications for a vehicle that would carry two men recumbent and two besides the driver, or else eight men in the sitting posture; to have the wagon traverse or turn on its own ground; to reduce the weight of the unloaded vehicle to within half a ton, and to have the parts interchangeable, and the body and running-gear so arranged that the parts might be separated and made to fold together compactly for facility in shipment. The Board examined various patent wheels and springs, and listened to a description of the Davis metallic wheel, and examined several models of bodies and of running-gear.

On April 9, 1875, another meeting of the full Board was held; memoranda of the weights and materials of approved ambulance wagons were presented and discussed, and the specifications of the ambulance wagon in progress at the Allegheny Wagon Works were considered.

On May 21, 1875, the Board again assembled, all the members being present. In the interval the individual members had examined many models, drawings, and descriptions of ambulance vehicles at the museum of the Patent-Office and in various military reports. The following specifications of the model of ambulance wagon to be recommended to the War Department were unanimously adopted:

Specifications for an ambulance wagon (approved by a Board convened by Special Orders No. 44, War Department, A. G. O., March 16, 1875).

BODY.

SILLS., 9 feet 2 inches long out to out (including 13 inches projecting in front for foot-board), $2\frac{1}{2}$ inches wide by 2 inches deep.

FOOT-BOARD, of best ash, 1 inch thick, 11 inches broad, 4 feet long, fastened to sills 2 inches from front bar by three (3) bolts; $\frac{1}{2}$ inch round foot-iron projecting 4 inches and raised 2 inches, with stay-iron at center, and fastened to sills by three (3) bolts at either end, passing through foot-board; foot-iron flattened at either end and middle, latter roughened, with an additional piece of iron welded on to make a roughened step 4 inches wide.

CROSS-BARS, five (5), mortised into the sill; front bar $2\frac{1}{4}$ inches wide by $2\frac{1}{2}$ inches deep; three (3) middle bars, 2 inches wide by $1\frac{1}{2}$ inches deep; back-bar $2\frac{1}{2}$ inches wide by $2\frac{1}{2}$ inches deep, to project 6 inches from the body on either side, with iron braces to studs, to be described hereafter, and mortised horizontally near the ends to receive sills.

LONGITUDINAL CENTRAL BAR, one (1), $2\frac{1}{2}$ inches wide by 2 inches deep, notched to receive cross-bars.

FLOOR, of clear seasoned white pine, $\frac{1}{2}$ inch thick, dressed and screwed to the cross-bars.

BODY, 4 feet wide from out to out, 8 feet 1 inch long (exclusive of foot-board). The sides of the body are composed of a frame-work, consisting of an upper and lower rail, with nine (9) equidistant braces or studs, mortised into the lower rail, and passing through the upper rail (which surmounts the lower panel) to the height of the upper panel; the upper panel is of the best ash, three inches wide, $\frac{1}{2}$ inch thick; the middle panel is of clear yellow seasoned poplar, $\frac{1}{2}$ inch thick, 7 inches wide. The upper rail of oak, surmounting the lower panel, is 2 inches wide and 1 inch deep, and projects at either end beyond the lower panel sufficiently to fasten the front and tail boards, with nine (9) equidistant mortises, $1\frac{1}{2}$ inches by $\frac{1}{2}$ inch, through which the studs or braces pass. The lower panel is of best poplar, $\frac{1}{2}$ inch thick and 11 inches wide. The lower panel is within, the middle and upper panels outside of, the braces or studs. The lower rail, 2 inches wide, 1 inch deep, and 8 feet 1 inch long, has nine (9) mortises to receive the studs or braces, and, on the under side, at points midway between the second and third braces and the seventh and eighth braces, two (2) iron stubs, let in flush and firmly screwed to the lower rail, 3 inches long by 2 inches broad, and $\frac{1}{2}$ inch thick, with a stub-pin $\frac{1}{2}$ inch in diameter and $\frac{1}{2}$ inch long, slightly beveled on the outside, so as to enter a corresponding hole in lower stub-plates of same dimensions, which are let into and secured to the sills.

TAIL-BOARD.—Width of inside of body, consisting of an oak frame, an upper and lower rail, into which are mortised four (4) studs or braces of the same width and thickness as those on the sides, with a panel of poplar 11 inches wide and $\frac{1}{2}$ inch thick.

FRONT-BOARD.—Of the same materials and dimensions as the tail-gate, and forming the front of the box under the driver's seat.

BACK-STEP.—Of ash, 1 inch thick, 8 inches wide, 3 feet long, 18 inches below the top of the back cross-bar; fastened at 6 inches from either end of the step to iron rests, oval $\frac{1}{2}$ -inch iron, bolted to the back-bar and step by $\frac{1}{4}$ -inch bolts. The step is further supported by 2 iron stays of $\frac{1}{2}$ -inch oval iron flattened at both ends and bolted, with the rests, to the step, and, passing obliquely upwards and outwards, bolted to the sill on either side at a distance that will clear the hind springs.

BOX OR DRIVER'S SEAT.—The front is formed by the front board of the body; the back by a pine board 13 inches wide, $\frac{1}{2}$ inch thick; length, the inside width of the body, held in place by two (2) parallel cleats on either side 1 inch apart, and screwed to the upper and lower rails and lower panel; the distance from the middle of the

space between the cleats to the back of the front-board is 13 inches. The top is of pine, about 1 inch longer than the back, the ends resting on the upper rails, the fore and hind edges resting on the front and back of the box, hinged to the back part of the box and fastened by a hinged hasp to the front-board. An oak beading $\frac{1}{2}$ inch thick, $\frac{1}{2}$ inch wide, is tacked along the front edge of the top.

LAZY-BACK.—Of ash, 6 inches wide, $\frac{1}{2}$ inch thick; length of the inside width of the upper part of the body, let into a double-beveled iron socket fastened to the upper panel, and adjusted to receive a beveled iron tenon at either end of the lazy-back.

SEATS OR LITTERS.—Two seats or litters, composed of $\frac{1}{2}$ -inch poplar, 6 feet 8 inches long. Each seat consists of two (2) boards, the horizontal one, next the panel, 13 inches wide; the inner one, hinged to this and hanging vertically, $\frac{1}{2}$ inches wide. The outer boards each rest on three quadrangular frame oak supports, the uprights mortised into the horizontal bars. These frame supports are $1\frac{1}{2}$ inches square, and the uprights are $1\frac{1}{2}$ inches high. One is hinged at the middle and the others near the extremities of the board next the panel. When the seat is converted into a litter, the supports are folded against the under side of the board, two (2) to the rear, and one (1) to the front for the right, and the reverse for the left litter.

At the inner edge of each of the end uprights next the panel, near the hinge, is attached an iron loop or bracket, with 1-inch rise, screwed to the upright, and perforated by $\frac{1}{2}$ -inch hole, to contain the pivot of a cast-iron wheel 3 inches in diameter and 1 inch thick. The pivot is a wrought iron $\frac{1}{2}$ -inch bolt: one end is riveted in the hole in the raised loop or bracket, the other in a socket attached to an iron plate 3 inches long by $1\frac{1}{2}$ inches wide and $\frac{1}{2}$ inch thick, screwed opposite the loop, on the edge of the upright that becomes the under edge when the support is folded up, the wheel revolving about the bolt. The inner $\frac{1}{2}$ -inch board is strengthened by a cleat of oak, $1\frac{1}{2}$ inches wide by $\frac{1}{2}$ inch in thickness, extending across the middle of the board, to which it is screwed; the cleat on the right hand projects 1 inch beyond the board, to sustain the opposite board when both are used as litters; and in like manner the left-hand cleat is shortened 1 inch. Near either end of the inner litter-board is a triangular framed oak support, consisting of upright and horizontal pieces connected by diagonal brace, the horizontal piece hinged to the board. The pieces of this support are of the dimensions of the supports already described: and the inner edge of the uprights are provided with iron wheels, as will be described for the supports next the panel, and as nearly opposite to them as possible with the fulfillment of other requirements. They are to be hinged so as to fold in an opposite direction to the supports of the seats near the panel, and so arranged that when the inner board is vertical, the triangular supports pass by and rest against, and thus sustain in position, the square supports of the seat. When folded, they are maintained by brass catches.

BOWS.—Five (5) bows, of ash, $1\frac{1}{2}$ inches wide, by $\frac{1}{2}$ inch thick, passing through iron brackets or staples on the upper panel, with tenons at either end to fit into brackets or staples secured to the upper rail. Top flat, with rounded corners. Height from upper surface of floor to ridge-pole 4 feet 6 inches. A curtain-rail, of ash, $1\frac{1}{2}$ inches wide, 1 inch thick, is fastened on either side to the end of the bows, at the commencement of the spring, by a thumb-screw. A ridge-pole, an inch wide, by $\frac{1}{2}$ inch in thickness, is similarly fastened to the middle of the end of the bows. Four (4) ribs, $1\frac{1}{2}$ inches wide, by $\frac{1}{2}$ inch thick, equidistant between the five bows, and attached to the ridge-pole and curtain-rails by iron loops or hasps.

TRIMMINGS AND FIXTURES.—Top, curtains, hood, and bonnet, of 12-ounce cotton duck, $28\frac{1}{2}$ inches wide, Army standard. Top fastened to bows, just above curtain-rails on either side, by five (5) iron staples and pins, and overlapping 2 inches. Four curtains on either side, lapping the upper panel 3 inches, and secured by nine (9) wire staples and pins to the upper panel on either side, and by a staple and pin on each bow, on either side, at the middle of the edges of the curtains. Back-curtain to be firmly sewed to rear edge of top, and to be broad enough to lap and fasten at the sides by the staples and pins of the fourth curtains, and secured to tail-gate by four (4) staples and pins. Front-curtain to fasten to first rib by four (4) curtain-knobs and to the back of box by three (3) curtain-knobs. All curtains to have circular stay-pieces of good leather, 2 inches in diameter, well sewed to the canvas with waxed harness-thread. Staple-pins will be attached to $\frac{1}{2}$ -inch leather straps, 6 inches long, well sewed to curtains. All curtains to have roll-up straps and buckles. The litters, inner surface of two upper panels and lazy-back are to be upholstered with best curled horse-hair, seats $2\frac{1}{2}$ inches, panels $\frac{1}{2}$ inch thick, and covered with russet leather of good quality. The cushion for the driver's seat or box is of the same material and finish as the cushions for the seats or litters. The interior of the box is divided into two unequal parts by a $\frac{1}{2}$ -inch partition, sliding between cleats on the front and back of the box, 15 inches from the left side of the body. One (1) keg, of oak, 16 inches long, 10 inches in diameter at center, and 9 inches at either end, bound with eight (8) brass hoops, $\frac{1}{2}$ inch wide, and supported by neat rests, and steadied by straps attached to rests, buckling over the top of keg near either end. A circular aperture, near the front of the left lower panel, will permit the outer end of the keg to project 1 inch. The rests will be

so arranged as to prevent strain or breakage of the panel: keg to be supplied with an inch bung-hole, and with $\frac{1}{2}$ -inch nickel-plated globe-cock, with T-handles and tinned shank to screw in. Wear-irons of $\frac{1}{2}$ -inch angle-iron, 6 inches long, bolted to sill, where the fore-wheels are liable to strike. The sides of the body are maintained upright by a jointed stay passing from the back bar to the upper rail. An iron brace of round iron, 1 inch in diameter at bottom, and tapering to $\frac{1}{2}$ inch at top, terminating in a hinge to a T firmly bolted to the top rail. The lower end is provided with a shoulder, 2 inches in diameter, to rest on the hind cross-bar, and passing through it is reduced to $\frac{1}{2}$ inch in diameter, and is secured by a washer and nut. The brace is so curved as to enter the hind cross-bar vertically. At either end of the upper rails of the tail-gate and front-board are iron loops, $1\frac{1}{2}$ inches in width, $\frac{3}{16}$ inch thick, riveted to these rails, and are large enough to receive the projecting ends of the upper side rails; they are secured in position by iron pins, passing through the upper side rails, and fastened by small chains to the upper rails of the tail-gate and front-board. The tail-gate is hinged to the back-bar by four (4) iron straps, one to each of the four (4) studs, 8 inches long, $1\frac{1}{2}$ inches wide, $\frac{1}{16}$ inch thick, each ending below in a loop or eye to form half of a hinge; the other half is formed by adjacent eyes or loops bolted to the hind-bar. Through the eight (8) eyes or loops passes a $\frac{1}{2}$ -inch round wrought-iron rod, with a bolt-head at one end and a screw and nut at the other. The front-board is fastened differently to the front-bar. The lower ends of $1\frac{1}{2}$ -inch iron straps, screwed to the four (4) studs, are slightly curved forward and slide into four (4) staples in the front-bar. The sides are attached to the body, each by three strap-hinges, 3 inches wide at the hinge, and narrowing to $1\frac{1}{2}$ inches at the ends, securely screwed through the panels and flooring to the front, middle and hind cross-bars, and the first, fifth and ninth stud. The straps are $\frac{1}{4}$ inch thick, the vertical arm 8 inches, and the horizontal 6 inches in length, countersunk for five (5) screws in each arm. On the upper rail, over the first, third, fifth, seventh and ninth studs, are five (5) wrought-iron bar-staples, securely screwed to the rail, to receive the tenons of the bows, the opening of the staples, 1 inch wide, and $\frac{1}{8}$ inch deep in the clear. At five (5) corresponding points on each upper panel, midway between the upper and lower edges of the panel, are screwed (5) bar-staples, with openings a trifle over $1\frac{1}{2}$ inches by $\frac{1}{8}$ inch, that the bows may pass through them. All twenty (20) of these bar-staples will be of iron, $\frac{3}{16}$ of an inch in thickness, 1 inch wide, and 3 inches in length. The boards of the seats or litters next the panels are hinged to the middle board by three (3) strap hinges, one in the middle, and one near either end, $1\frac{1}{2}$ inches wide, with arms 5 inches long, securely screwed to the seat or litter-boards. The upright quadrangular supports of the litter-boards next the panel, and the triangular supports of the middle-boards, are hinged to those boards with butt-hinges of suitable size and strength. The ridge-pole passes through seven (7) bar-staples screwed to center of the ribs, and all of the bows except the first and ninth, and is fastened to these by a thumb-screw. The curtain-rails have each seven (7) mortises to receive rectangular flat iron hooks, $1\frac{1}{2}$ inches wide, $\frac{3}{16}$ inch thick, adjusted to fit readily into the mortises, and screwed to the ends of the ribs and to the inner surface of the bows, at the commencement of the spring, just below the curtain-rail. The bonnet-iron, of $\frac{1}{2}$ -inch round iron, passing through the hem of the bonnet, is hinged to the front bow, below the curtain-rail. A whip-socket is strapped on the right, and a socket for the ambulance flag on the left upper panel, just ahead the front bow. The hospital flag should be of best yellow bunting, 18 inches square, with a capital H, in green, 6 inches high, stitched in the middle on either side.

All the wood and iron work to be of the best materials. The sills, cross-bars, central-bar, studs, upper and lower rails of sides, front and tail boards, cleats, and curtain rails, must be of best seasoned white oak; the front-board, back-step, upper panels, lazy-back, bows, and ribs of best seasoned ash; the flooring, top, and back of driver's seat are of clear seasoned white pine; the lower and middle panels, the middle and outer litter-boards, and the panels of the front-board and tail-gate are of best clear seasoned yellow poplar.

The body is readily prepared for packing, by removing the lazy-back and front-board, the top and back of the driver's box and tail-gate. The nut on the brace under the hind-bar is then unscrewed and withdrawn from the cross-bar, and permits the side to be folded against the floor, just meeting its fellow. The hood and bonnet being removed or not, the curtain-rails and ridge-pole, the thumb-screws being loosened and slid out from the catches or hooks and the bar-staples, and the ribs and bows can then be folded close together and laid over one part of the folded body, while the tail-gate and three sides of the driver's seat, spread out flatly, are laid over another portion.

RUNNING-GEAR.

SPRINGS.—Platform, of No. 3 steel, English, oil-tempered. Two (2) front side-springs 43 inches long by $1\frac{1}{2}$ inches wide, of seven (7) plates; one (1) front cross-spring 48 inches long by $1\frac{1}{2}$ inches wide, of seven (7) plates, connected with couplings

or hangers. Two (2) hind side-springs, 51 inches long, of seven (7) leaves, the front end resting on U-shaped stays of 1-inch oval iron, securely bolted to sills, and each further supported by an iron bar of 1-inch oval iron, passing obliquely upward and inward to be fastened to the central-bar. One (1) cross back-spring attached to body with iron stays; this is 48 inches long, and of seven (7) leaves like the rest; it is coupled to the ends of the hind side-springs, and is fastened by clips of 1-inch half-oval to a semi-elliptic 1-inch round wrought-iron bar, flattened at the ends, to be bolted to the under side of the back-bar, just inside of the attachments of the rests for the back-step; this semi-elliptic bar is reinforced and squared to the width of the back-spring; a small wooden block is interposed between the bar and spring at their junction. The hind side-springs are set on wooden blocks, 6 inches long and 3 inches deep, clipped to axle by chips of $\frac{1}{2}$ -inch square iron. The front cross-spring rests on and is clipped to a wooden block 18 inches long, $3\frac{1}{2}$ inches deep, and 2 inches wide, which is clipped at either end to the ends of the futchells, by $\frac{1}{2}$ -inch half-oval iron, flattened on top. The front side-springs are clipped to the axle over blocks 6 inches long, 3 inches deep, $1\frac{1}{2}$ inches wide, by $\frac{1}{2}$ -inch square iron. All clips of best charcoal iron, and the ends to pass through iron plates $\frac{1}{2}$ -inch thick, 1 inch wide, to serve as washers. All springs to have French heads and 5 inches sweep.

WHEELS. back, 4 feet 2 inches high (without tire); front wheels 3 feet 2 inches high; hubs (of best gum) $6\frac{1}{2}$ inches in diameter at center, $5\frac{1}{2}$ inches at butt and $4\frac{1}{2}$ inches at the point, by 9 inches in length; butt with iron bands on each end mortised for sixteen (16) hind and fourteen (14) front spokes. Size of mortise $1\frac{1}{2}$ inches by $9\frac{1}{16}$ inch, with $\frac{1}{4}$ -inch stagger and $\frac{1}{4}$ -inch dish; spokes (best seasoned hickory) $1\frac{1}{2}$ inches by $\frac{1}{4}$ inch (hub tenon) felloe tenon, round, $\frac{1}{4}$ -inch inch in diameter; felloes (best hickory) $1\frac{1}{2}$ inches, two (2) pieces for each wheel; tire (best charcoal iron) $1\frac{1}{2}$ inches wide, by $\frac{1}{2}$ inch thick, fastened on with eight (8) tire-bolts in each wheel; two (2) felloe-plates in each wheel over joints.

AXLES.—Of best quality refined iron; $1\frac{1}{2}$ -inch, left square 7 inches from each collar-washer, balance round; collar-washer $2\frac{1}{2}$ inches in diameter, $\frac{1}{2}$ inch thick; wheel-boxes, of best quality foundry iron, $7\frac{1}{2}$ inches long, $1\frac{1}{2}$ inches in diameter, $7\frac{1}{16}$ inch thick at butt; $1\frac{1}{2}$ inches in diameter and $5\frac{1}{16}$ inch thick at point, with two (2) lugs, 2 inches long, $\frac{1}{2}$ inch high. Oil-chamber, 2 inches long, $1\frac{1}{16}$ inch deep, to commence $2\frac{1}{2}$ inches from the butt. Weight of box, not less than $4\frac{1}{2}$ pounds each. Axle to be arranged to track 5 feet from center to center of wheels. Front axle to have two (2) inches upward curve at center; hind axle, one (1) inch upward curve at center.

FUTCHELLS (or hounds) $1\frac{1}{2}$ inches thick from jaws to front of hound-bed; jaws 18 inches long; hounds of length to suit the springs; from the hound-bed the thickness is reduced to $1\frac{1}{2}$ inches; side-bars and splinter-bars $1\frac{1}{4}$ inches thick, with 1-inch half-oval iron rod, extending from splinter-bar to back of futchells, passing under and bolted to futchell-bed, with ends flattened and bolted to futchells; to have an iron plate on inside of jaws, $\frac{1}{2}$ inch thick, the depth of the futchell, and 18 inches long, secured to jaws by $\frac{1}{2}$ -inch rivet at each end.

FUTCHELL-BED.—Bed $3\frac{1}{2}$ inches deep by $2\frac{1}{2}$ inches wide and 26 inches long, with iron plate $\frac{1}{2}$ inch thick, bolted on under side, full length and width of bed. Transom-plate, 17 inches long, $2\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, secured by two (2) $\frac{1}{2}$ -inch diameter bolts, countersunk heads passing through the bed and plate with hole to receive $\frac{1}{2}$ -inch king-bolt in center. Plate to be grooved to receive upper transom plate, thus preventing accident from breaking of king-bolt.

CHAIRS, consisting of three bars framed together, and securely bolted to futchell-bed. Centre-bar, $2\frac{1}{2}$ inches thick at bottom, tapering to 2 inches thick at top, ends to show 2 inches thick. Front and rear bars $1\frac{1}{2}$ inches thick. All bars to be 4 feet long and 5 inches deep at center, and cut away by degrees until the depth is reduced to 2 inches at the ends. The waste wood may in like manner be cut away from the upper surface over the central part. The upper transom-plate, resting on the center-bar, is $\frac{1}{2}$ inch thick, and of width and length to fit neatly into lower half of transom plate on the futchell-bed; the upper transom plate is secured by two (2) $\frac{1}{2}$ -inch bolts, with countersunk head, passing through plate and central-bar of chairs.

FIFTH WHEEL.—Two (2) circles of iron, 19 inches in diameter from out to out, $1\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, with iron tire or hoop $\frac{1}{2}$ inch wide and $\frac{1}{2}$ inch thick, shrunk on outer edge of lower half to receive upper half of wheel. Lower half secured to futchells and futchell-bed with intervening wooden blocks by six (6) bolts, with countersunk heads; the upper half fastened securely to chair by bolts with counter-sunk heads.

SIDE-BARS $1\frac{1}{2}$ inch square, mortised into futchell-bed and splinter-bar, to have iron plates $\frac{1}{2}$ inch thick, full length and width of bars, securely bolted to them, and welded to plates under splinter-bar and hound-bed.

SPLINTER-BAR 4 feet 4 inches long, $1\frac{1}{2}$ inches square, to rest on top of hounds, with 1-inch oval-iron full length of bar passing under futchells, with bolt through splinter-bar and futchell. This iron to have two (2) lugs on outer side of futchells to hold them in place, and to drop $1\frac{1}{2}$ inches below them, arranged for a half-elliptic spring,

to which the swing-tree will be attached; to have on top of splinter-bar an iron plate 1 inch wide, $\frac{1}{8}$ inch thick, extending 15 inches from end, and 8 inches on side-bar, securely bolted to each. Splinter-bar to have a 3-inch diameter, roughened iron step on either end.

TONGUE OR POLE.—The pole is $2\frac{1}{2}$ inches wide at futchells and tapering back to 2 inches at back end, $1\frac{1}{2}$ inches deep; 9 feet 6 inches long from futchells to extreme end in front; $1\frac{1}{2}$ inches square at front end, with iron goose-neck, at front end of pole, of $\frac{1}{2}$ -inch round iron flattened to 1 inch by $\frac{1}{4}$ inch, secured to tongue by two (2) 5-16-inch bolts; neck not less than 6 inches long.

HALF-ELLIPTIC SPRING.—The half-elliptic spring, above referred to, is $1\frac{1}{2}$ inches wide, of No. 3 English oil-tempered steel, with five (5) leaves; extreme length 3 feet 6 inches.

SWING-TREES. 34 inches long, 2 inches in diameter in center and $1\frac{1}{2}$ inches at ends, with $\frac{1}{2}$ -inch iron staple in the center, passing through and riveted to the tree; swing-trees fastened to an iron rod from a half-elliptic steel spring, back of splinter-bar, by a swivel attachment of iron, from ends of springs to center of each swing-tree, with ferrules $1\frac{1}{2}$ inches long and rings of 5-16-inch iron, $1\frac{1}{2}$ inches in diameter; cock-eyes 3 inches long and $\frac{1}{2}$ inch in diameter, with thread on each end of the cock-eyes that enter the swing-trees.

BRAKE.—A horizontal, transverse, 1-inch round iron bar, 4 feet 8 inches long, passes through U-shaped $\frac{1}{2}$ -inch round iron stays, bolted to the sills just in front of the stays to which the front ends of the hind side-springs are connected, and descending 4 inches below the sills; at the lower parts the U-shaped stays are formed into eyes, through which the transverse rod passes. To either end of the transverse horizontal bar is welded a flattened curved bar of iron, averaging 1 inch wide by $\frac{1}{8}$ of an inch deep. On the right side it has an arm 10 inches high, which extends upward at right angles to the transverse bar, and is jointed to a longitudinal $\frac{1}{2}$ -inch iron rod, extending to and jointed on a lever near the foot-board. The lower arms on both sides are somewhat curved outwardly, and arranged to receive rut-blocks, 8 inches long, $2\frac{1}{2}$ inches wide, and $2\frac{1}{2}$ inches thick (as shown in drawing), fastened by two (2) 5-16-inch bolts. The lever consists of an iron curved bar on the right side, 1 inch wide by $\frac{1}{8}$ inch thick, ending below in an eye or ring, to receive a fixed bolt, which is securely attached to the sill, just above the central bar of the chairs. The lever is 18 inches high, and terminates in a foot-rest or roughened step, bent outwardly at right angles, of flattened iron. This longitudinal rod, already described, is jointed to the lever through an eye 4 inches above the sill, and is of such a length that the lever will be vertical when not in use.

PAINTING.

EXTERIOR.—Sides, middle and lower panel, front and tail boards, dark olive-green; upper panel, ridge pole and curtain rails, varnished; rails and sills, black on outside; running-gear and inside, lower panel of front-board, tail-gate, and top and back of driver's seat and sills and rails, of maroon color; iron-work, black. All to be painted one coat of lead color and two coats of other colors, finally to be varnished with two coats of varnish. Between the second and third bows, on each middle panel, the letters U. S., 6 inches high, will be conspicuously painted in yellow, of the tint of the hospital flag.

GENERAL WORKMANSHIP.

Spokes and wheel-boxes to be well wedged; tenons secured with wooden pins, except those of the bows; all welds to be made smooth and strong; corners of felloes to be rounded between spokes; studs chamfered between rails; chairs and ends of all blocks to be chamfered and neatly finished; all clips rounded to $\frac{1}{2}$ -inch diameter, with cross-tie washers 1 inch by $\frac{1}{4}$ inch; sharp corners of bows to be removed; coverings of litters and lazy-back to be well fastened with best copper or brass headed tacks.

The ambulance wagon is to be so constructed that the several parts of any one wagon will agree and exactly fit those of any other, so as to require no numbering or arranging for putting together, and all the materials used for their construction to be of the best quality, and the work in all its parts faithfully executed, in the best workmanlike manner.

INSPECTION.

The work shall be inspected from time to time, as it progresses, by an officer or agent of the War Department, and none of it shall be painted or upholstered until it shall have been inspected and approved by said officer or other agent, authorized to inspect it.

(See drawings and lithographs, marked A; drawing by McConnell, lithographs by Sinclair & Son.)

An informal note from the Ordnance Office, stating that such models as might be required by the Board could be prepared at the shops controlled by that department, was received. An instruction from the Secretary of War, that the final report of the Board, with the requisite drawings and illustrations, should be printed, was communicated.

The Board then decided that a preliminary report, in writing, should be made, with the recommendation that the Ordnance Department should be instructed to prepare three models of ambulance wagons, in accordance with the specifications prepared by the Board, on a scale of three inches to the foot, and that four or six ambulance wagons of full size should be constructed, as soon as practicable, under the supervision of the Ordnance Department, strictly in accordance with the same specifications, save that one of the wagons will be supplied with the Sarven patent wheel, and one with the Davis metallic wheel and axle, with such modifications of the running-gear as these changes might necessitate. The Board furthermore recommended that the officers composing it should be ordered to resume their several stations and duties, subject to the call of the President of the Board, to reconvene at such time and place as the public interest might require, when the experimental wagons proposed for construction by the Ordnance Department should be completed, with a view of suggesting such modifications as might be requested, and of maturing the formal final report.

Respectfully submitted.

(Signed)

RUFUS INGALLS,

Colonel and Assistant Quartermaster-General U. S. A., President.

(Signed)

GEORGE A. OTIS,

Assistant Surgeon U. S. A., Recorder.

WASHINGTON, May 27, 1875.

[First indorsement.]

WAR DEPARTMENT,

Washington, May 31, 1875.

Respectfully referred to the Surgeon-General and the Quartermaster-General, for remark.

(Signed)

E. D. TOWNSEND,

Adjutant-General.

To be sent from office of the Surgeon-General to that of the Quartermaster-General, and thence returned to this office.

[Second indorsement.]

SURGEON-GENERAL'S OFFICE,

June 2, 1875.

Respectfully transmitted to the Quartermaster-General, and recommended for approval.

(Signed)

J. K. BARNES,

Surgeon-General.

[Third indorsement.]

WAR DEPARTMENT,
QUARTERMASTER-GENERAL'S OFFICE,
Washington, June 4, 1875.

Respectfully returned to the Adjutant-General, United States Army, recommending approval excepting that the sample ambulances be constructed by the Quartermaster's Department instead of the Ordnance Department.

Reference is respectfully made to communication of the Acting Quartermaster-General of the 1st instant, to the Hon. Secretary of War, relative to construction of the said sample ambulances.

(Signed) RUFUS INGALLS,
Acting Quartermaster-General, Brig. Major-General, U. S. A.

WAR DEPARTMENT,
QUARTERMASTER-GENERAL'S OFFICE,
Washington, D. C., June 1, 1875.

SIR: Referring to the preliminary report of the Board convened by paragraph 4, Special Orders No. 44, War Department, Adjutant-General's Office, March 16, 1875, submitted to the War Department on the 28th ultimo, in which it was recommended that the offer of the Ordnance Department to construct the several sample ambulances be accepted, I have the honor to state that I now prefer that the Quartermaster's Department should construct the said ambulances.

Very respectfully, your obedient servant,

(Signed) RUFUS INGALLS,
Acting Quartermaster-General, Brig. Major-General, U. S. A.

The Honorable the SECRETARY OF WAR.

[Fourth indorsement.]

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,
Washington, June 5, 1875.

Respectfully submitted to the Secretary of War.

(Signed) E. D. TOWNSEND,
Adjutant-General.

Indorsements on communication from the Acting Quartermaster-General to the Secretary of War, dated June 1, 1875, (ante.)

[First indorsement.]

The recommendations of the preliminary report are approved.

As there has been a great deal said as to the quality of work which the Ordnance Department could do, and as in

personal conversation with members of the Board I have expressed the opinion that it would be best under the circumstances to comply with the recommendations of the Board and see what the Ordnance Department could do in that direction, I think it best that the recommendation of the Board should be carried out and the sample ambulances made by the Ordnance Department.

(Signed)

WM. W. BELKNAP,
Secretary of War.

WASHINGTON, June 5, 1875.

[Second indorsement.]

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,

Washington, June 10, 1875.

Respectfully referred to the Chief of Ordnance for his information and action, inviting attention to the orders of the Secretary of War, indorsed hereon.

These papers to be returned to the files of this office, when no longer required.

By order of the Secretary of War.

(Signed)

E. D. TOWNSEND,
Adjutant-General.

WASHINGTON, August 16, 1875.

The preliminary report of the Board having been approved and referred to the Chief of Ordnance, the commandant of Watervliet Arsenal was directed to construct the wagons in accordance with the specifications furnished by the Board.

General Hagner having requested a conference with some member of the Board, with regard to some modifications of the original specifications, the Recorder was sent at this date to Watervliet.

A copy of the specifications, as modified, is appended.

(Signed)

GEORGE A. OTIS,
Assistant Surgeon U. S. A., Recorder of the Board.

Proposed specifications for the construction of an ambulance wagon, showing alterations from printed specifications. (Approved by a Board convened by Special Orders No. 44, War Department, A. G. O., March 16, 1875.)

BODY.

SILLS, 9 feet 2 inches long, out to out (including 13 inches projecting in front for foot-board), $\frac{1}{2}$ inches wide by 2 inches deep.

FOOT-BOARD, of best ash, 1 inch thick, 11 inches broad, 4 feet long, fastened to sills 2 inches from front bar by three (3) bolts at each end; $\frac{1}{2}$ inch round foot-iron projecting 4 inches, and raised 2 inches, with a stay at center and fastened to sills by three (3) bolts at either end, two passing through foot-board and sill, one passing also through front and chair; foot-iron flattened at either end and the middle; the ends roughened, with an additional piece of iron welded on to make a roughened step 4 inches wide and 6 inches long, projecting outside of foot-board $1\frac{1}{2}$ inches. Three bolts secure middle stay to foot-board.

CROSS-BARS, five (5), mortised into the sill; front bar $2\frac{1}{2}$ inches wide by $2\frac{1}{2}$ inches deep; three (3) middle bars 2 inches wide by $1\frac{1}{2}$ inches deep; back bar $2\frac{1}{2}$ inches wide by $2\frac{1}{2}$ inches deep, to project 6 inches from the body on either side, with iron braces to studs, to be described hereafter, and mortised horizontally near the end to receive sills.

LONGITUDINAL CENTRAL BAR, one (1) $2\frac{1}{2}$ inches wide by 2 inches deep, notched to receive cross-bars.

FLOOR, of clear seasoned white pine $\frac{1}{2}$ inch thick, dressed and screwed to the cross-bars (matched).

BODY, four feet wide from out to out, 8 feet 1 inch long (exclusive of foot-board). The sides of the body are composed of a frame-work, consisting of an upper and lower rail, with nine (9) equidistant braces or studs, mortised into the lower rail and passing through the upper rail (which surmounts the lower panel) to the height of the upper panel; the upper panel is of the best ash, 3 inches wide, $\frac{1}{2}$ inch thick; the middle panel is of clear yellow seasoned poplar, $\frac{1}{2}$ inch thick, 7 inches wide. The upper rail of oak, surmounting the lower panel, is 2 inches wide and 1 inch deep, and projects at either end beyond the lower panel sufficiently to fasten the front and tail boards, with nine (9) equidistant mortises, $1\frac{1}{2}$ inches by $\frac{1}{2}$ inch, through which the studs or braces pass. The lower panel is of best poplar, $\frac{1}{2}$ inch thick, and 9-6 inches wide. The lower panel is within, the middle and upper panels outside of, the braces or studs. The lower rail, 2 inches wide, 1 inch deep, and 8 feet 1 inch long, has nine (9) mortises to receive the studs or braces, and, on the under side, at points, $5\frac{1}{2}$ inches from front stud, and $10\frac{1}{2}$ inches from rear stud, two (2) iron stubs, let in flush and firmly screwed to the lower rail, 3 inches long by 2 inches broad and $\frac{1}{2}$ inch thick, with a stub-pin $\frac{1}{2}$ inch in diameter and $\frac{1}{2}$ inch long, slightly beveled on the top, so as to enter a corresponding hole in lower stub-plates of same dimensions, which are let into and screwed to the sill. A slide-door with spring-latch is made in each lower third panel (on both sides), of half the size of the panel, plus $\frac{1}{2}$ lap.

TAIL-BOARD, width of inside of body, consisting of an oak frame, and upper and lower rail, into which are mortised four (4) studs or braces, of the same width and thickness as those on the sides, with a panel of poplar 9-6 inches wide and $\frac{1}{2}$ inch thick.

FRONT-BOARD, of the same materials and dimensions as the tail-gate, and forming the front of the box under the driver's seat.

BACK STEP, of ash, 1 inch thick, 8 inches wide, 3 feet long, 18 inches below the top of the cross-bar; fastened 6 inches from either end of the step to iron rests, oval $\frac{1}{2}$ inch iron, bolted to the back bar and step by 5-16 inch bolts. The step is further supported by three (3) iron stays of $\frac{1}{2}$ inch oval iron, one in the center and one at each end; the center stay is fastened at top to the longitudinal bar by a wood screw, square head; the end stays by the side bolt, passing through the stub-plates. The lower ends of all the stays are screwed under the step by two bolts to each, heads countersunk in the step.

BOX, OR DRIVER'S SEAT.—The front is formed by the front-board of the body; the back by a pine board 13 inches wide, $\frac{1}{2}$ inch thick, length the inside width of the body, held in place by two parallel cleats on either side, 1 inch apart, and screwed to the upper and lower rails and lower panel; the distance from the middle of the space between the cleats to the back of the front-board is 13 inches. The top is of pine, about $\frac{1}{2}$ inch longer than the back, the ends resting on the upper rails, the front edge even with front of box, and the rear hinged to a strip $1\frac{1}{2}$ inches wide, screwed to the back part of the box. The top is fastened by a hinged hasp to the front-board. An oak heading $\frac{1}{2}$ inch thick, $\frac{1}{2}$ inch wide, is tacked along the front and rear edge of the top to hold the cushions in place.

LAZY-BACK.—Of ash, 6 inches wide, $\frac{1}{2}$ inch thick, length (including irons) of the inside width of the upper part of the body; the irons consist of two (2) round open

sockets, with foot-plates fastened each side to the upper panel, and fitted to round tenons, riveted through ears to either end of the lazy-back.

Bows.—Five (5) bows of ash, $1\frac{1}{2}$ inches wide, by $\frac{3}{8}$ inch thick, passing through iron brackets or staples on the upper panel, with tenons at either end to fit into brackets or staples, secured to the upper rail. Top flat, with rounded corners. Height from upper surface of floor to ridge-pole, 4 feet 6 inches. Two (2) curtain-rails of ash, $\frac{3}{4}$ inch in diameter, pass through loops fastened on either side to the bows, at the commencement of the spring, by screws. A ridge-pole, an inch wide by $\frac{1}{2}$ inch in thickness, passes through staples similarly fastened to the middle of the bows. Four (4) ribs, $1\frac{1}{2}$ inches wide by $\frac{3}{8}$ inch thick, equidistant between the five bows, have attached to each of them (to receive ridge-poles and curtain-rails) like loops and staples. The curtain-rails enter loop sockets at front bows, and are secured by pin and socket attached to rear bow. The ridge-pole enters a staple socket in front bow, and is secured by thumb-screw to rear bow.

TRIMMINGS AND FIXTURES.—Top, curtains, hood, and bonnet, 8-ounce double McIntosh cloth, $2\frac{1}{2}$ inches wide. Top fastened to button on bows, just above curtain-rails on either side by five (5) elastic buttons and holes, and overlapping 2 inches. Four curtains on either side, lapping the upper panel 3 inches, and secured by nine (9) elastic buttons and holes to buttons on the upper panel on either side, and by like elastic buttons and holes to buttons on each bow, on either side at the middle of the edges of the curtains. Back curtains to be firmly sewed to rear edge of top, and to be broad enough to lap and fasten at the sides by elastic button-holes to the buttons for the fourth curtain, and secured to button-hooks on tail-gate by four (4) elastic button-holes. Front curtain to fasten to first rib by four (4) curtain knobs and eyelets, and to the back of box by three (3) knobs, two (2) curtain fasteners, and two (2) straps and buttons. All curtains to have roll-up straps with eyelets for knobs. The back-boards inside of the two upper panels and the lazy-back are to be upholstered with best curled horse-hair, $\frac{1}{2}$ inch thick, and covered with leather of good quality.

The cushions for the driver's seat, or box, is of the same material and finish, and 2 inches thick. The interior of the box is divided into two unequal parts by a $\frac{1}{2}$ -inch partition, sliding between cleats on the front and back of the box, 15 inches from the left side of the body. One (1) keg, of oak, 16 inches long, 10 inches in diameter at center, and 9 inches at either end, bound with eight brass hoops, $\frac{1}{2}$ inch wide, is supported by neat rests, and steadied by brackets fastened to top of driver's seat. A circular aperture near the front of the left lower panel will permit the outer end of the keg to project 1 inch. The rests will so be arranged as to prevent strain or breakage of the panel; keg to be supplied with an inch bung-hole, and with $\frac{1}{2}$ -inch nickel-plated globe-cock, with T-handles and tinned shank to screw in. Wrench to fit the axle-nuts is carried above this keg on two hooks. Guard-plates of $\frac{1}{2}$ -inch angle-iron, 6 inches long, are bolted to sills, on either side, where the fore wheels are liable to strike. The sides of the body are maintained upright by a jointed stay passing from the back-bar to the upper rail. This stay is composed of a brace of round iron, $\frac{1}{2}$ inch in diameter at the bottom and tapering to $\frac{3}{8}$ inch at the top, hinged neatly to a T firmly riveted to the top rail. The lower end is provided with a shoulder $1\frac{1}{2}$ inches in diameter, to rest on the hind cross-bar, and passing through, it is reduced to $\frac{3}{8}$ inch in diameter, and is secured by a washer and nut. The brace is so shaped as to enter the hind cross-bar vertically. At either end of the upper rails of the tail-gate and front-board are iron loops, $1\frac{1}{2}$ inches in width, $\frac{3}{8}$ inch thick, riveted to these rails, and are large enough to receive the projecting ends of the upper side-rails. The tail-gate is secured, when closed, by slide-bolts fastened to upper panels and bolting through the upper side rails.

The tail-gate is hinged to the back-bar by four (4) iron straps, one to each of the four (4) studs, 8 inches long, $1\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, each ending below in a loop or eye to form half of a hinge; the other half is formed by adjacent eyes or loops bolted to the hind-bar. Through the eight (8) eyes or loops passes a $\frac{1}{2}$ -inch round wrought-iron rod, with a bolt-head at one end and a screw and nut at the other. The front-board is fastened differently to the front-bar. The lower ends of $1\frac{1}{2}$ -inch iron straps screwed to the four (4) studs are slightly curved forward and slide into four (4) staples in the front-bar. The sides are attached to the body, each by three strap-hinges $1\frac{1}{2}$ inches wide, securely screwed to the three interior cross-bars and the third, fifth, and seventh studs. All the wood and iron work to be of the best materials. The sills, cross-bars, central-bar studs, upper and lower rails of sides and front, and tail-boards, cleats, and curtain-rails must be of best seasoned white oak; the foot-board, back step, upper panel, lazy-back, bows and ribs of best seasoned ash; the flooring, top, and back of driver's seat are of clear seasoned white pine; the lower and middle panels of the front-board and tail-gate are of best clear seasoned yellow poplar. The body is readily prepared for packing by removing the lazy-back and front-board, the top and back of the driver's box, and tail-gate. The nut on the brace under the hind rail is then unscrewed, and the side can then be folded against the floor, just meeting its fellow. The hood and bonnet being removed, the curtain-rails and ridge-

pole, the thumb-screws being loosened and slid out from the catches or loops, and the ribs and bows can then be folded close together and laid over one part of the folded body, while the tail-gate and three sides of the driver's seat spread out flatly are laid over another portion.

RUNNING-GEAR.

SPRINGS.—Platform, of No. 3 steel, English, oil-tempered. Two (2) front side-springs, $4\frac{1}{4}$ inches long by $1\frac{1}{4}$ inches wide, of seven (7) plates: one (1) front cross-spring, 46 inches long by $1\frac{1}{4}$ wide, of seven (7) plates, connected with couplings or hangers. Two (2) hind side-springs, $49\frac{1}{2}$ inches long, of seven (7) leaves, the front end resting on U-shaped stays of 1-inch oval iron, securely bolted to sills, and each further supported by an iron bar of 1-inch oval iron, passing obliquely upward and inward, to be fastened to the central bar. One cross back-spring attached to body with iron stays. This is 46 inches long, and of seven leaves, like the rest; it is coupled by triple-jointed couplings to the ends of the hind side-springs, and is fastened by clips of $\frac{1}{2}$ -inch half-oval to semi-elliptic oval 1 by $1\frac{1}{4}$ -inch wrought-iron bar, flattened at the ends, to be bolted to the under side of the back-bar, just inside of the attachments of the rests for the back step; this semi-elliptic bar is re-enforced and squared to the width of the back-spring; a small wooden block is interposed between the bar and spring at their junction.

The hind side-springs are set on wooden blocks 6 inches long and $2\frac{3}{4}$ inches deep, clipped to axle by clips of $\frac{1}{2}$ -inch half-oval. The front cross-spring rests on and is clipped to a wooden block 18 inches long, $3\frac{1}{2}$ inches deep, and 2 inches wide, which is clipped at either end to the ends of the futchells by $\frac{1}{2}$ -inch half-oval iron, flattened on top. The front side-springs are clipped to the axle over blocks 6 inches long, $2\frac{1}{2}$ inches deep, $1\frac{1}{4}$ inches wide, by $\frac{1}{2}$ inches half-oval iron. All clips of best charcoal iron, and the ends to pass through under straps, with the nuts on the under side. Sweep of springs: front side 7 inches; front cross, $4\frac{1}{2}$ inches; back cross, $6\frac{1}{2}$ inches; back side, $5\frac{1}{2}$ inches.

WHEELS, back, 4 feet 2 inches high (without tire): front wheels, 3 feet 2 inches high; hubs (of best elm) $6\frac{1}{2}$ inches in diameter at center, $5\frac{1}{2}$ inches at butt, and $4\frac{1}{2}$ inches at the point, by 9 inches in length; butt with iron bands on each end, mortised for fourteen (14) hind and fourteen (14) front spokes. Size of mortise, $1\frac{1}{8}$ inches by $\frac{1}{16}$ inch, (with $\frac{1}{2}$ -inch staggers or without. If 16 spokes are used in hind wheel, give $\frac{1}{2}$ -inch staggers; if only 14 spokes, there will be no stagger); and $\frac{1}{2}$ -inch dish; spokes (best seasoned hickory), $1\frac{1}{4}$ inches by $\frac{1}{16}$ inch; (hub-tenon) felloe-tenon, round, $\frac{1}{2}$ inch in diameter; felloes (best hickory), $1\frac{1}{2}$ inches, two (2) pieces for each wheel, joined by sheet-iron dowels $\frac{1}{4}$ inch thick; tire (best charcoal iron), $1\frac{1}{2}$ inches wide by $\frac{1}{2}$ inch thick, fastened on with eight (8) tire-bolts in each wheel; two (2) felloe-plates in each wheel over joints.

AXLES.—Of best quality refined iron, $1\frac{1}{2}$ inch, left square 7 inches from each collar-washer, balance round; collar-washer, $2\frac{1}{2}$ inches in diameter, $\frac{1}{8}$ inch thick; wheel-boxes of best quality foundry-iron, $7\frac{1}{2}$ inches long, $1\frac{1}{2}$ inches in diameter, $\frac{1}{16}$ inch thick at butt, $1\frac{1}{8}$ inches in diameter, and $\frac{1}{16}$ inch thick at point, with two (2) lugs, 2 inches long, $\frac{1}{2}$ inch high, and having recesses for leather collars $\frac{1}{2}$ inch wide and $\frac{1}{8}$ deep at each end. Oil-chamber, 2 inches long, $\frac{1}{16}$ inch deep, to commence $2\frac{1}{2}$ inches from the butt. Weight of box not less than $4\frac{1}{2}$ pounds each. Axle to be arranged to track 5 feet from center to center of wheels. Front axle to have two (2) inches upward curve at center; hind axle, one (1) inch upward curve at center.

FUTCHELLS (or hounds), $2\frac{1}{2}$ inches thick from jaws to front of hound-bed; jaws, 18 inches long; hounds of length to suit the springs; from the hound-bed the thickness is reduced to $1\frac{1}{2}$ inches; side-bars and splinter-bars, $1\frac{1}{2}$ inches thick, with 1-inch half-oval iron rod extending from splinter-bar to back of futchells, passing under and bolted to futchell-bed, with ends flattened and bolted to futchells; to have an iron plate on inside of each jaw $\frac{1}{4}$ inch thick, the depth of the futchell, and 18 inches long, secured to jaws by $\frac{1}{4}$ -inch rivet at each end and one screw in center.

FUTCHELL-BED.—Bed, $3\frac{1}{2}$ inches deep by $2\frac{1}{2}$ inches wide and 32 inches long, with iron plate $\frac{1}{4}$ inch thick bolted on under side, full length and width of bed. Transom-plate, $24\frac{1}{2}$ inches long, $2\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, secured by four (4) bolts, 2 of $\frac{1}{2}$ -inch diameter and 2 of $\frac{1}{4}$ inch, countersunk heads passing through the bed and plate, with hole to receive $\frac{1}{2}$ -inch king-bolt in center. Plate to be grooved to receive upper transom-plate, thus preventing accident from breaking of king-bolt.

CHAIRS, consisting of three bars framed together and securely bolted to sills. Center bar, $2\frac{1}{2}$ inches thick at bottom, tapering to 2 inches thick at top; ends to show 2 inches thick. Front and rear bars to be $1\frac{1}{2}$ inches thick. All bars to be 4 feet $3\frac{1}{2}$ inches long and $5\frac{1}{2}$ inches deep at center, and cut away by degrees until the depth is reduced to 2 inches at the ends. The waste wood may in like manner be cut away from the upper surface over the central part. The upper transom-plate resting on the center bar is $\frac{1}{2}$ inches thick, and of width and length to fit neatly into lower half of transom-plate on the futchell-bed. The upper transom-plate is secured by two (2) $\frac{1}{2}$ -inch

inch bolts and two (2) $\frac{1}{2}$ -inch bolts, with countersunk head, passing through plate and central bar of chairs.

FIFTH-WHEEL.—Two (2) circles of iron, 28 inches (or 30) in diameter from out to out, $1\frac{1}{2}$ inch wide, $\frac{1}{8}$ inch thick, with iron tire or hoop, $\frac{1}{8}$ inch wide and $\frac{1}{4}$ inch thick, shrunk on outer edge of lower half to receive upper half of wheel. Lower half secured to futchells and futchell-bed, with intervening wooden blocks, by six (6) bolts, with countersunk heads; the upper half fastened securely to chairs by bolts, with countersunk heads.

SIDE-BARS., $1\frac{1}{2}$ by $1\frac{1}{2}$ inch, mortised into futchell-bed and splinter-bar, to have iron plates $\frac{1}{8}$ inch thick, full length and width of bars, securely bolted to them and welded to plates under splinter-bar and hound-bed.

SPLINTER-BAR, 4 feet 4 inches long, $1\frac{1}{2}$ inches square, to rest on top of hounds, with 1-inch flat iron, full length of bar, passing under futchells, with bolt through splinter-bar and futchell; this iron to have two (2) lugs on outer side of futchells to hold them in place, and to drop $1\frac{1}{4}$ inches below them, arranged for a half-elliptic spring, to which the swing-tree will be attached; to have on top of splinter-bar an iron plate 1 inch wide, $\frac{1}{8}$ inch thick, extending 15 inches from end and $\frac{1}{8}$ inches on side-bar, securely bolted to each. Splinter-bar to have a 3 by $5\frac{1}{2}$ inch roughened iron step on either end.

TONGUE, OR POLE.—The pole is $3\frac{1}{2}$ inches wide at futchells and tapering back to $2\frac{1}{2}$ inches at back end, $2\frac{1}{4}$ inches deep; 9 feet 2 inches long from futchells to extreme ends in front; $1\frac{1}{2}$ inches square at front end; and pole-iron, with eyes and pole-strap loops, secured to end of tongue by three (3) 5-16-inch bolts; neck not less than 6 inches long.

HALF-ELLIPTIC SPRING.—The half-elliptic spring, above referred to, is $1\frac{1}{2}$ inches wide, of No. 3 English oil-tempered steel, with five (5) leaves; extreme length 3 feet 6 inches.

SINGLE-TREES—34 inches long, 2 inches diameter in center and $1\frac{1}{2}$ inches at ends, with $\frac{1}{2}$ -inch iron staple in the center, passing through and riveted to the tree; single-trees fastened to an iron rod from a half-elliptic steel spring back of splinter-bar by a swivel attachment of iron from ends of springs to center of each single-tree, with ferrules $1\frac{1}{2}$ inches long and cock-eyes projecting for trace-loop $\frac{1}{8}$ inch; length of neck and head $6\frac{5}{16}$ by $1\frac{1}{16}$ inches width; cock-eyes 3 inches long and $\frac{1}{8}$ inch in diameter of shank, with thread on the ends that enter the single-trees, and secured from turning by a rivet through shank.

BRAKE.—A horizontal transverse 1-inch round iron bar, 4 feet 8 inches long, passes through U-shaped $\frac{1}{2}$ -inch round iron stays, bolted to the sills just in front of the stays to which the front end of the hind side-springs are connected, and descending 4 inches below the sills; at the lower part the U-shaped stays are formed into eyes, through which the transverse rod passes. To either of the transverse horizontal bars is welded a flattened curved bar of iron, averaging 1.3 inches wide by $\frac{1}{8}$ of an inch deep. On the right side it has an arm 10 inches high, which extends upward at right angles to the transverse bar, and is jointed to a longitudinal $\frac{1}{2}$ -inch iron rod extending to and jointed on a lever near the foot-board. The lower arms on both sides are somewhat curved outwardly, and the lower ends are fitted to form, with the jaws attached to rut-block irons, swinging joints. The rut-blocks are 8 inches long, $2\frac{1}{2}$ inches wide, and $2\frac{1}{2}$ inches thick (as shown in drawing). The lever consists of an iron curved bar on the right side 1 inch wide by $\frac{1}{8}$ inch thick, ending below in an eye or ring to receive a fixed bolt, which is securely attached to the sill 3 inches in front of the central bar of the chairs. The lever is 18 inches high and terminates in a circle of $\frac{1}{2}$ -inch round iron and of 4 inches external diameter.

The longitudinal rod, already described, is jointed to the lever through an eye 4 inches above the sill, and is of such a length that the lever will be vertical when not in use.

PAINTING.

EXTERIOR.—Body, middle and lower panel, front- and tail-boards, dark-olive green; upper panel, ridge-pole, and curtain-rails varnished; running-gear and inside, lower panel of front-board, tail-gate, and top and back of driver's seat, and sills and rails, of olive color; iron-work black. All to be painted one coat of lead color and two coats of other colors, finally to be varnished with two coats of varnish. Between the second and third bows, on each middle panel, the letters U. S., 6 inches high, will be conspicuously painted in yellow, of the tint of the hospital flag; and the red Greek cross, on a white ground, on the second lower panel. On the center panel of tail-board, "U. S. AMBULANCE, MEDICAL DEPARTMENT," in yellow.

GENERAL WORKMANSHIP.

Spokes and wheel-boxes to be well wedged; tenons secured with wooden pins, except those of the bows; all welds to be made smooth and strong; corners of felloes to be rounded between spokes; studs chamfered between rails; chains and ends of all

blocks to be chamfered and neatly finished; all clips rounded to $\frac{1}{8}$ inch diameter, with cross-tie washers 1 inch by $\frac{1}{2}$ inch; sharp corners of bows to be removed; coverings of litters and lazy-back to be well fastened with best copper or brass-headed tacks. The ambulance wagon is to be so constructed that the several parts of any one wagon will agree and exactly fit those of any other, so as to require no numbering or arranging for putting together, and all the materials used for their construction to be of the best quality, and the work in all its parts faithfully executed in the best workmanlike manner.

INSPECTION.

The work shall be inspected from time to time, as it progresses, by an officer or agent of the War Department, and none of it shall be painted or upholstered until it shall have been inspected and approved by said officer or other agent authorized to inspect it.

(See drawings marked B, furnished by Colonel Hagner, Ordnance Department.)

[Special Orders No. 187.]

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,
Washington, September 16, 1875.

[EXTRACT.]

* * * * * * * * * *
7. Major Alexander Chambers, Fourth Infantry, is relieved from duty as a member of the Board of Officers appointed to meet in this city by Special Orders No. 44, March 16, 1875, from this office, to decide upon the pattern and prepare specifications for the ambulance for Army use.
* * * * * * * * * *

By order of the Secretary of War.
(Signed)

E. D. TOWNSEND,
Adjutant-General.

Official:
(Signed) L. H. PELOUZE,
Assistant Adjutant-General.

WASHINGTON, *September 25, 1875.*

Assistant Surgeon George A. Otis was ordered to Watervliet Arsenal, West Troy, N. Y., to inspect the ambulance wagons before they were painted. His report to the President of the Board was approved.

[Special Orders No. 109.]

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,
Washington, October 4, 1875.

[EXTRACT.]

1. Maj. N. B. Sweitzer, Second Cavalry, is detailed as a member of the Board of Officers appointed to meet in this city by Special Orders No. 44, March 16, 1875, from this office, to decide upon a pattern and prepare specifications for the ambulance for Army use.
* * * * *

By order of the Secretary of War.
(Signed)

E. D. TOWNSEND,
Adjutant-General.

WASHINGTON, D. C., October 25, 1875.

The Secretary of War having authorized the expenditure of \$500 for the preparation of the final report of the Board, with the approval of the President, the Recorder obtained an estimate from the Congressional Printer of the approximate cost of the printing and paper and press-work, which amounted to \$80.95. With like authority the Recorder contracted with J. C. McConnell for working-drawings from the specifications, at a cost of \$84, which was paid by Mr. Crosby, chief clerk of the War Department, and with T. Sinclair & Sons, Philadelphia, for lithographing these drawings, at a cost of \$300, to include drawing, printing, boxing, and delivery.

The specifications and drawings having been forwarded to General Hagner, a number of discrepancies (Appendix 10) became the subject of correspondence between the Ordnance Office and the Board, and the details were finally arranged with the concurrence of the members of the Board and the Ordnance Office charged with the construction.

The construction of the wagons approaching completion, General Hagner requested a conference with the members of the Board relative to some portions of the work in which he believed that deviations from the original specifications might be advantageously introduced. At the request of the President of the Board, the Surgeon-General ordered, August 16, 1875, Assistant Surgeon Otis to proceed to Watervliet, to carry out the instructions of the Board in a conference with General Hagner. After minutely inspecting the work, as far as it had proceeded, and authorizing the alterations which the Board had decided on, the Recorder returned to Washington and reported the progress of the work verbally to General Ingalls and by letter to Major Chambers.

The construction of the wagons was now rapidly pushed toward completion. The principal alteration that had been made consisted—

1. In increasing the diameter of the circle and fifth wheel, whereby the stability of the body was increased and the tendency to lateral oscillation much diminished.
2. In modifying the futchell-bed and chairs so as to make

the fore-wheels to traverse readily, even when the wagon was loaded with eight men.

3. In diminishing the diameter of the cross and longitudinal bars of the frame-work without sacrifice of strength, and with great saving of weight, and likewise effecting a great saving of weight in some of the iron and wood work by chamfering or by absolute reduction of the sizes.

4. Modification of the brake.

5. Rejection of the Davis wheel, the contractors having failed to comply with their offer.

The six wagons were therefore ordered to be, one nearly of the pattern originally proposed, three with wide circles and the various improvements suggested during construction, one with the Sarven wheel, one with choice wooden wheel, with less stagger than in the original specifications.

Early in September General Hagner requested that a final inspection of the vehicles might be had before they were painted. Major Chambers having been relieved from the Board by Special Order 187, September 16, 1875, and his other duties preventing General Ingalls from making the inspection, Assistant Surgeon Otis was again ordered, September 25, 1875, by the Surgeon-General to go to Watervliet for this purpose. His report was approved by the President of the Board on his return.

The foregoing minute was read and approved.

(Signed) RUFUS INGALLS,

Colonel and Assistant Quartermaster-General, President of Board.

(Signed) GEORGE A. OTIS,

Assistant Surgeon U. S. A., Recorder of the Board.

WASHINGTON, D. C., December 6, 1875.

A meeting of the Board was held, and various modifications in the construction of the wagons having been discussed, and a request having been received from the commandant of Watervliet Arsenal that a final inspection of the wagons might be made, Maj. N. B. Sweitzer and Assistant Surgeon George

A. Otis were ordered to proceed to West Troy, N. Y., for this purpose. The Surgeon-General laid before the Board a letter from J. E. Allen, of Harrisburg, calling attention to the claims of the Rucker ambulance wagon.

(Signed) **RUFUS INGALLS,**
Colonel and Assistant Quartermaster-General, President.

(Signed) **GEORGE A. OTIS,**
Assistant Surgeon U. S. A., Recorder.

Maj. N. B. Sweitzer and Assistant Surgeon G. A. Otis proceeded on December 6, 1875, to West Troy and carefully examined the details of one complete wagon and of five others in process of construction. Returning, they stopped in New York and examined the litters and stretchers that it was proposed to use in connection with the wagon.

WASHINGTON, D. C., December 18, 1875.

A meeting of the Board was held at the office of the Quartermaster-General. Major Sweitzer and Assistant Surgeon Otis reported the result of their observations and suggested some modifications in the arrangement of the litters and frame-work of the wagons, which modifications the Recorder was instructed to communicate to the Chief of Ordnance and to the officer at Watervliet charged with the construction of the ambulances. Communications were received from Colonel Hagner relative to litters, &c.

WASHINGTON, December 20, 1875.

The Recorder communicated personally to General Benét the request of the Board, and dispatched a letter to General Hagner to the same effect.

WASHINGTON, December 27, 1875.

At a meeting of the Board on this date at the Quartermaster-General's Office, Mr. H. N. Jasper (Appendix 11) presented a

model and description of a so-called manumotive, bullet-proof ambulance, convertible into a portable rifle-pit, and requested its consideration by the Board. He was informed that he should be notified of the next meeting of the Board.

J. J. Halstead, esq., attorney for J. E. Allen, on January 6, 1876, called to request that the Board would give due consideration to the ambulance wagon constructed by Mr. Allen under General Rucker's instruction, and patented by a Mr. Smith. A letter on the same subject was received from Mr. Allen. These gentlemen were informed that they would be notified of the next meeting of the Board, and have an opportunity of presenting their views.

JANUARY 12, 1876.

The Recorder received a letter from Col. P. V. Hagner (Appendix 12) advising him of the shipment of four ambulances, with four varieties of litters and one model ambulance, and that they would arrive on the 15th.

The President of the Board directed that on their arrival they should be stored at the Washington Arsenal, and that a meeting of the Board should be convened as soon as possible after the 18th instant, and that inventors and other parties interested should be notified.

JANUARY 20, 1876.

The Board assembled, and made some experimental trials with the ambulance wagons in conference with the Surgeon-General and other officers of the Medical, Ordnance, and Quartermaster Departments.

The principal alterations which it was deemed desirable to introduce in the vehicle which should be recommended as the regulation wagon for Army use were then discussed and agreed upon, and it was decided to request authority of the Secretary of War for the construction of such wagon under the immediate supervision of the Board.

Among the communications received was one from the Chief of Ordnance, General Benét, advising the Board of the arrival of the ambulance wagon constructed at Watervliet. (Appendix 13.)

JUNE 16, 1876.

The Board held a formal meeting, and considered the various communications that had been received. Among them was a letter from the Chief of Ordnance to the Secretary of War, asking for reimbursement from the appropriation for the Quartermaster's Department for the expense incurred in constructing the wagons and small models of the same. Secondly, a report on this communication by the Quartermaster-General, in which the utility of the investigations of the Board were severely criticised and the likelihood of any improvement being made upon the Wheeling pattern of ambulance called in question. Thirdly, an answer of the Chief of Ordnance. Fourthly, a rejoinder by the Surgeon-General to this report of the Quartermaster-General.

The Board ordered that a review of their previous action should be drawn up, showing that the exceptions made arose from a misapprehension of the true facts of the case; that the Board had acted in strictest compliance with the orders received and with the recommendations of the Quartermaster-General and Surgeon-General. The draught of this paper was read at the meeting of the next day, June 17, and signed and forwarded to the Secretary of War, with a reiteration of the recommendation that a sample ambulance wagon should be constructed in accordance with the matured views and specifications, and the suggestion that this could be economically done at the government shops of the Quartermaster's Department at Jeffersonville, Indiana.

AUGUST 18, 1876.

Col. Rufus Ingalls, assistant quartermaster-general, was relieved as a member of the Board on Army Ambulances, and

Col. L. C. Easton, assistant quartermaster-general, appointed on the Board, to date August 31, 1876, in accordance with—

[Special Orders No. 170.]

HEADQUARTERS OF THE ARMY, ADJUTANT-GENERAL'S OFFICE,
Washington, August 18, 1876.

[EXTRACT.]

* * * * *

3. By direction of the Secretary of War, Col. L. C. Easton, assistant quartermaster-general, will, on the 31st instant, relieve Col. Rufus Ingalls, assistant quartermaster-general, of his duties in charge of the general depot of the Quartermaster's Department in New York City and as member of the Board on Army Ambulances, appointed by Special Orders No. 44, March 16, 1875, from the War Department. Colonel Ingalls, on being relieved by Colonel Easton, will report to the commanding general Military Division of the Pacific for duty as chief quartermaster of the division and in charge of the quartermaster's depot at San Francisco. He is authorized to take with him two of his employés.

* * * * *

By command of General Sherman.

(Signed)

E. D. TOWNSEND,
Adjutant-General.

[Special Orders No. 3.]

HEADQUARTERS OF THE ARMY, ADJUTANT-GENERAL'S OFFICE,
Washington, January 6, 1877.

[EXTRACT.]

* * * * *

4. By direction of the Secretary of War, Maj. N. B. Sweitzer, Second Cavalry, is, at his own request, relieved from duty as a member of the Board of officers appointed to meet in this city by Special Orders No. 44, March 16, 1875, from the War Department, to decide upon a pattern and prepare specifications for the ambulance for Army use, and Col. Thomas L. Crittenden, Seventeenth Infantry, is detailed in his stead.

Major Sweitzer will report at the headquarters of his regiment for duty.

* * * * *

By command of General Sherman.

(Signed)

E. D. TOWNSEND,
Adjutant-General.

The following letter, from the Adjutant-General of the Army, was received on February 20, 1877, by the President of the Board:

HEADQUARTERS OF THE ARMY, ADJUTANT-GENERAL'S OFFICE,
Washington, February 20, 1877.

Col. T. L. CRITTENDEN,

Seventeenth Infantry, President Board on Army Ambulances, Washington, D. C.:

SIR: I have the honor to inform you that the papers in the case of the "Ambulance Board" have been submitted to the Secretary of War, who has directed "that a model ambulance be built in this city, under the direction of the depot quartermaster, at such private establishment as he may select; the Ambulance Board to supervise the building of the same in accordance with its plans," and that "upon its completion as a sample the ambulance be submitted to the Quartermaster-General for his consideration and the approval of the Secretary of War."

The Secretary has further directed that Colonel Easton be replaced on the Board by either Lieutenant-Colonels Bingham or Hodges, of the Quartermaster's Department, and the Quartermaster-General has been requested to designate one of those officers for detail accordingly.

Very respectfully, your obedient servant,

(Signed)

E. D. TOWNSEND,
Adjutant-General.

The Recorder was in receipt of the following from the Adjutant-General:

HEADQUARTERS OF THE ARMY, ADJUTANT-GENERAL'S OFFICE,
Washington, February 24, 1877.

SIR: Referring to letter of the 20th instant to Col. T. L. Crittenden, Seventeenth Infantry, copy furnished you at date, communicating the Secretary's decision relative to the Ambulance Board, I have respectfully to inclose copy of order from this office, detailing Lieut. Col. H. C. Hodges, deputy quartermaster-general, as a member of the Board in place of Col. L. C. Easton, thereby relieved, and to transmit herewith certain papers, including reports of the Board relative to the subject under consideration.

Very respectfully, your obedient servant,
(Signed)

E. D. TOWNSEND,
Adjutant-General.

Assistant Surgeon G. A. OTIS, U. S. A.,
Recorder Board on Ambulance Wagons, Washington, D. C.

The papers alluded to in the above letter of the Adjutant-General of the Army consisted of the preliminary report of the Board and the request of the Ordnance Department for reimbursement from the funds of the Quartermaster's Department for the manufacture of the experimental wagons and miscellaneous papers, &c., pertaining to the same.

[Special Orders No. 42.]

HEADQUARTERS OF THE ARMY, ADJUTANT-GENERAL'S OFFICE,
Washington, February 24, 1877.

[EXTRACT.]

* * * * *

2. By direction of the Secretary of War, Col. L. C. Easton, assistant quartermaster-general, is hereby relieved from duty as a member of the Board of officers appointed to meet in this city, by Special Orders No. 44, March 16, 1875, from the War Department, to decide upon a pattern and prepare specifications for the ambulance for Army use, and Lieut. Col. C. H. Hodges, deputy quartermaster-general, is detailed in his stead.

* * * * *

By command of General Sherman.
(Signed)

E. D. TOWNSEND,
Adjutant-General.

WASHINGTON, D. C., February 28, 1877.

By direction of Col. T. L. Crittenden, Seventeenth Infantry, President of the Board, a meeting was held at the Quartermaster-General's Office, at 11 o'clock a. m., all of the members being present.

The President of the Board laid before the members the communication from the Adjutant-General of the Army of the

20th instant. It was decided that the members of the Board should proceed to Soldiers' Home to inspect the ambulance wagons manufactured at Watervliet arsenal, that presented by the Russian Government, and other patterns, and should subsequently consult with Messrs. McDermott Brothers, carriage-builders, in reference to the construction of a model ambulance wagon.

The Board then adjourned, subject to the call of the President.

(Signed) **T. L. CRITTENDEN,**
Colonel Seventeenth Infantry, President of the Board.

(Signed) **GEORGE A. OTIS,**
Assistant Surgeon U. S. A., Recorder of the Board.

WASHINGTON, March 1, 1877.

The members of the Board, the President, Colonel Hodges, and the Recorder visited Soldiers' Home and examined the different ambulance vehicles there, and then adjourned to meet at the carriage factory of Messrs. McDermott Brothers, 310 Pennsylvania avenue, on March 12.

(Signed) **T. L. CRITTENDEN,**
Colonel Seventeenth Infantry, President of the Board.

(Signed) **GEORGE A. OTIS,**
Assistant Surgeon U. S. A., Recorder of the Board.

WASHINGTON, March 12, 1877.

The Board assembled in obedience to the call of the President, at 11 a. m., at the carriage factory of McDermott Brothers, 310 Pennsylvania avenue.

The depot quartermaster, Capt. A. F. Rockwell, attended the meeting.

Various details in the construction of the proposed ambulance were discussed. Several small models, as well as full-sized wagons, were inspected. After further discussion, the carriage-builders were requested to make an estimate of the

cost of building such an ambulance wagon as called for by the specifications placed in their hands, together with an estimate of the cost of such alterations as the Board might direct in the process of the construction of the experimental wagon. The Board then adjourned, subject to the call of the President.

(Signed) T. L. CRITTENDEN,
Colonel Seventeenth Infantry, President of the Board.
 (Signed) GEORGE A. OTIS,
Assistant Surgeon U. S. A., Recorder of the Board.

WASHINGTON, April 4, 1877.

The Board convened this day at the office of the Quartermaster-General, at 11 a. m., pursuant to the call of the President. All of the members, Col. T. L. Crittenden, Seventeenth Infantry, Lieut. Col H C Hodges, deputy quartermaster-general, and Assistant Surgeon George A. Otis were present.

After discussing a plan submitted by McDermott Brothers, carriage-builders, 310 Pennsylvania avenue, for constructing an ambulance wagon, in accordance with the specifications furnished by the Board, it was decided to accept Messrs McDermott's proposition and request the depot quartermaster to contract with him for the construction of a wagon on the terms proposed in his letter of March 28, 1877, to the depot quartermaster.

It was decided that a margin of \$50 over the estimate might be allowed if necessary for carrying out such alterations or experiments as the Board might suggest.

(Signed) T. L. CRITTENDEN,
Colonel Seventeenth Infantry, President of the Board.
 (Signed) GEORGE A. OTIS,
Assistant Surgeon U. S. Army, Recorder of the Board.

APRIL 10, 1877.

In accordance with the instructions of the Board the following was communicated to the depot quartermaster:

WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE,
Washington, April 10, 1877.

SIR: I have the honor to inform you that, at a meeting of the Board convened by Special Orders No. 44, paragraph 4, War Department, Adjutant-General's Office, March

16, 1875, held at the office of the Quartermaster-General April 4, 1877, it was decided, in pursuance of the instructions of the Secretary of War, that the depot quartermaster should be requested to contract with McDermott Brothers, 310 Pennsylvania avenue, to construct an ambulance wagon, in accordance with specifications prepared by the Board. The propositions submitted by McDermott Brothers, carriage-builders, in a letter to the depot quartermaster, were approved, with a provision that a margin of, say, \$50 should be allowed the manufacturers, if needed, to reimburse them for alterations in carrying out the specifications that the Board may suggest in the process of constructing the vehicle. I am instructed by the President of the Board to communicate to you this extract from the minutes of its proceedings, and to request you to make the necessary arrangements with McDermott Brothers for the construction of the ambulance wagon, under the supervision of the Board.

Very respectfully, your obedient servant,
(Signed)

GEORGE A. OTIS,
Assistant Surgeon U. S. A., Recorder of the Board.

The sample ambulance wagon authorized by the Secretary of War, February 20, 1877, to be "built in this city, under the direction of the depot quartermaster, at such private establishment as he may select, the Ambulance Board to supervise the building of the same, in accordance with its plans," having been completed by Messrs. McDermott Brothers, on October 30, 1877, the Board made the following report to the Secretary of War:

REPORT OF A BOARD OF OFFICERS CONVENED BY SPECIAL ORDERS No. 44, WAR DEPARTMENT, A. G. O., WASHINGTON, MARCH 16, 1875, AND VARIOUS SUPPLEMENTARY SPECIAL ORDERS.

The Board of officers appointed to decide upon a pattern of ambulance wagon for Army use, by Special Orders No. 44, §4, War Department, Adjutant-General's Office, Washington, March 16, 1875, of which the organization was successively modified by Special Orders 187, §7, War Department, Adjutant-General's Office, Washington, September 16, 1875, and by Special Orders 199, §1, October 4, 1875, and by Special Orders 170, §3, August 18, 1876, and by Special Orders 3, Headquarters of the Army, Adjutant-General's Office, Washington, January 6, 1877, §4, and by Special Orders No. 42, Headquarters of the Army, Adjutant-General's Office, Washington, February 24, 1877, §2, would respectfully call attention to the preliminary report submitted May 27, 1875, in which it was recommended that the Ordnance Department should be instructed to prepare three models of ambulance wagons, in accordance with specifications prepared by the Board, on a scale of three inches to the foot, and four or six ambulance wagons of full size, under the supervision of the Board on Ambulances, in accordance with the same specifications, and that one of the wagons should be supplied with Sarvin patent wheel, one with the Davis metallic wheel and axle, with such modifications of the running-gear as experiment might necessitate. The Board also laid down certain principles which experience had established in

the construction of four-wheeled ambulance vehicles for Army use, and further recommended that the members of the Board be ordered to resume their several stations and duties subject to the call of the President of the Board to reconvene at such time and place as the public interest might require, when the experimental wagons proposed for construction by the Ordnance Department should be completed, suggesting such modifications as might be required, and maturing the formal final report.

The Hon. W. W. Belknap, Secretary of War, June 5, 1875, approved the recommendations of the Board. On June 1, 1875, the Acting Quartermaster-General had addressed a communication to the Secretary of War, requesting that the experimental ambulance wagons should be constructed by the Quartermaster's Department instead of by the Ordnance Department; but Secretary Belknap indorsed on this recommendation: "As there has been a great deal said as to the quality of work which the Ordnance Department could do, and as, in personal conversation with members of the Board, they have expressed the opinion that it would be best under the circumstances to comply with the recommendations of the Board, and see what the Ordnance Department could do in that direction, I think it best that the recommendation of the Board should be carried out and the sample ambulance made by the Ordnance Department. (Signed) W. W. Belknap, Secretary of War." General S. V. Benét, Chief of Ordnance, immediately issued orders for the construction of six experimental wagons at Watervliet Arsenal, West Troy, in strict accordance with the specifications furnished by the Board, and under the immediate supervision of Col. P. V. Hagner, U. S. A. In the preparation of the experimental ambulances various efforts to surmount obstacles to perfecting a safe, convenient, and not too costly sick-transport, two-horse, four-wheeled, vehicles for Army use were successively made.

The President of the Board on several occasions reconvened the members to discuss the difficulties presented, and on three occasions—August 16, 1875, September 25, 1875, and December 6, 1875—one or more of the junior members of the Board visited Watervliet and conferred with Colonel Hagner on the alterations that had to be adopted. In January, 1876, the experimental ambulance wagons were completed. Two of them remained at Watervliet; four were sent to Washington, two of which were subsequently sent to Philadelphia and displayed at the Centennial Exhibition. Although it was admitted that some of the difficulties of construction had not been overcome, yet it was believed that very many important points had been satisfactorily determined, and that the six ambulance vehicles constructed, though not fully meeting the anticipations of the projectors, were still excellent as serviceable vehicles, possessing many advantages over those now in use in the Army. On June 16, 1876, the Board held a formal meeting, and carefully considered the principal alterations which it was deemed desirable to intro-

duce in the model to be recommended to the War Department as the regulation ambulance wagon for the Army, and it was decided that authority should be requested of the Secretary of War for the construction of such a vehicle by mechanics to be selected by the depot quartermaster, to work under the direct supervision of the members of the Board. At this meeting a communication was read from the Chief of Ordnance, requesting reimbursement from the Quartermaster's Department appropriation to defray the cost of the construction of the ambulance wagons; also, a report on ambulance patterns by the Quartermaster-General of May 10, and a report from the Surgeon-General on the same subject; which papers had been referred to the President of the Ambulance Board for its consideration and remark June 2, 1876. The President of the Board, Col. Rufus Ingalls, returned the reports above enumerated to the Secretary of War with the succinct explanation of the measures and investigations that the Board had accomplished, and a reiteration of the recommendation that a pattern of an ambulance wagon should be constructed in Washington in accordance with the specifications the Board then felt in a position to recommend. On February 20, 1877, Adjutant-General Townsend addressed a letter to the President of the Board, Col. T. L. Crittenden, informing him that the honorable Secretary of War, Don. Cameron, had directed "that a model ambulance be built in this city, under the direction of the depot quartermaster, at such private establishment as he may select, the Ambulance Board to supervise the building of the same in accordance with its plans." The construction of the wagon was contracted for by Capt. A. F. Rockwell, depot quartermaster, with John McDermott & Co., and was completed in August, 1877. A photograph of the vehicle is transmitted with this report. The results have afforded the members of the Board almost unqualified satisfaction, and they have been gratified that it has met the approval of many officers of experience and high rank who have bestowed much attention on the subject.

The Board with a certain confidence recommends this pattern of ambulance-wagon to the honorable Secretary of War as the pattern two-horse, four-wheeled ambulance-wagon for sick-transport in the Army, for patients either in a sitting or recumbent posture. Experience may show that some slight alteration may be required, but the members of the Board believe that the pattern submitted meets the present requirements of the Army. To conclude this part of the work it would, be desirable that fourteen (14) similar vehicles be at once constructed and subjected to field service in different parts of the country, varying in climate and geographical features. Moreover, it would be desirable that the Medical Department should be called upon to recommend a uniform standard pattern of field litter or stretcher, and it is further respectfully recommended that the Board conclude its labors by the printed publication of its proceedings, together with a succinct review of the various methods

for wheeled ambulance transportation that have been employed in our Army.

All of which is respectfully submitted.

(Signed)

T. L. CRITTENDEN,

Colonel Seventeenth Infantry, President of the Board.

(Signed)

HENRY C. HODGES,

Deputy Quartermaster-General, U. S. A.

• (Signed)

GEORGE A. OTIS,

Assistant Surgeon, U. S. A., Recorder of the Board.

Specifications for ambulance-wagon for United States Army use, prepared by Board of Officers convened in Washington, D. C., by par. 4, S. O. No. 44, War Department, A. G. O., dated March 16, 1875 (organization modified by subsequent orders), and approved by the Secretary of War October 31, 1877.

BODY.

MAIN SILLS.—Two, 11 feet 1 $\frac{1}{2}$ inches extreme length (including 11 $\frac{1}{2}$ inches projection for toe-board, and 1 inch finish outside of tail-gate), 1 $\frac{1}{4}$ inches wide, 2 $\frac{1}{2}$ inches deep.

CROSS-BARS.—Three, mortised 1 $\frac{1}{2}$ inches into main sill. The front-bar to be 1 $\frac{1}{2}$ inches wide, 2 $\frac{1}{2}$ inches deep, and framed into main sill 11 $\frac{1}{2}$ inches from the front end. The back-bar 3 inches wide, 1 $\frac{1}{2}$ inches deep, to be framed into main sill 4 feet 4 inches from the front-bar out to out. The center-bar, 3 inches by 1 $\frac{1}{2}$ inches, framed into main sill equally distant between front and back bars.

BOTTOM SILLS.—Two, 6 feet 11 $\frac{1}{2}$ inches long, 3 inches wide, 1 $\frac{1}{4}$ inches deep, mortised to receive seven studs each; the studs 1 inch by 1 $\frac{1}{4}$ inch, and 9 $\frac{1}{2}$ inches long between the shoulders, with $\frac{1}{16}$ inch by width of studs; tenons on upper end and $\frac{1}{16}$ inch by width of stud; tenons on lower end so as to give a drop of 11 inches below bottom of main sill.

CROSS-BARS, framed into lower sill, five. The front-bar mortised to receive four studs, of same dimensions as those described for sides, passing through upper back-bar, forming front of drop or lower part of body, to be 3 inches wide, 1 $\frac{1}{4}$ inches deep. The back-bar 2 $\frac{1}{2}$ inches deep, 1 $\frac{1}{2}$ inches wide, to project 4 $\frac{1}{2}$ inches on either side of the body, and be mortised to receive ends of lower sills. The spring cross-bar to be 1 $\frac{1}{2}$ inches wide by 2 $\frac{1}{2}$ inches deep, resting on the back cross-spring. The three other bars to be framed into lower sill, equal distance apart, as in drawings. Width of body 4 feet 2 $\frac{1}{2}$ inches out to out, and 3 feet 11 inches in the clear inside.

SIDE PANELS of lower part of body to be of best yellow poplar, 9 $\frac{1}{2}$ inches deep, 6 feet 10 $\frac{1}{2}$ inches long, $\frac{1}{2}$ inch thick, screwed to inside of studs. The space between the first and second studs and the main and lower sills to be filled with a flush framed door, hung on two hinges, and fitted with lock and inside and outside handles, so that it may be opened from the inside or outside of the wagon. Lower front panel to have shifting-slat ventilators between the two outside studs and those next to them. The middle space to be paneled as the sides.

TAIL-GATE.—The length to be the same as the inside width of the body, and to comprise an oak frame with upper and lower rails 1 inch deep and 1 $\frac{1}{4}$ inches wide, into which are mortised four studs 1 inch by 1 $\frac{1}{4}$ inches. The lower rail to rest on the bottom of the back-bar, upper rail to be level with top of main sill. Panel $\frac{1}{2}$ inch thick screwed on inside of studs.

BOTTOM OF BODY to be of best white pine $\frac{1}{2}$ inch thick.

UPPER SIDES OF BODY to have top rail 10 feet 3 inches long (including 1 inch projection for finish of front end) and bottom rail 10 feet 2 inches long. Both rails 1 $\frac{1}{4}$ inches wide and 1 inch deep, and mortised for 11 studs, equally spaced apart. The studs to be 1 inch by 1 $\frac{1}{4}$ inches, 10 inches high between shoulders, and framed flush with inside of rails. The panels to be of best yellow poplar, $\frac{1}{2}$ inch thick, and screwed to outside of studs. These sides to be fastened to top of main sills by six hinges each, which are screwed to the inside of the first, third, fourth, seventh, eighth, and eleventh studs, counting from the front of body. Lower part of hinges to be screwed to the main sills. The upper part of these hinges to be 8 inches long, 1 $\frac{1}{4}$ inches wide, $\frac{1}{2}$ inch thick, and the lower end 2 inches by 2 $\frac{1}{2}$ inches, and $\frac{1}{2}$ inch thick, each part countersunk for five screws.

HINGES to be let in flush with inside of the body. Furthermore, each side-frame to have on under side of bottom rails two iron stub-pins, $\frac{1}{2}$ inch diameter, and projecting

$\frac{1}{2}$ inch, secured so as to enter a hole in a stub plate, which will be set into and screwed to the main sill.

FRONT-BOARD of same dimensions as tail-gate, and of same material, to form front of box under driver's seat. At either end of upper rails of tail-gate and front-board to be iron loops $1\frac{1}{2}$ inches wide, $\frac{3}{16}$ inch thick, which will be riveted to these rails and be large enough to receive the projecting ends of the main sills at the tail-gate and the upper rails at the front-board.

FRONT-BOARD STRAPS.—The front-board will be fastened to the front-bar by four iron straps screwed to the four studs, the lower ends to be curved forward and slide into the four staples secured to front-bar.

TAIL-GATE HINGES.—The tail-gate is hinged to back-bar by four iron straps, one to each of the four studs, to be $9\frac{1}{2}$ inches long, $1\frac{1}{8}$ inches wide, and $\frac{1}{4}$ inch thick, each ending below in an eye to form a half hinge, the other half being adjacent eyes which will be bolted to the back-bar. Through these eight eyes will be passed a continuous $\frac{1}{2}$ -inch iron rod, having a bolt-head at one end and a nut at the other end.

SIDE-STRAPS.—The sides of the body will be further held upright by a stay-rod at the rear end on each side. This stay will be of 1-inch round iron at the bottom, tapering to $\frac{3}{8}$ -inch at top, there flattened and terminating in a T, which will be firmly bolted to the main sill. The lower end to have a shoulder, $1\frac{1}{4}$ inches diameter, to rest on back cross-bar, and passing through it is reduced to $\frac{1}{2}$ inch and secured by washer and nut.

THE DRIVER'S SEAT AND BOX.—The front is formed by the front-board of the body. The top or seat board is of pine, 1 inch longer than the inside width of the body, the ends resting on the upper rails, and the front edge resting on the front of the body. This board to be 1 inch thick and 18 inches wide, of pine. This seat-board will be hinged to the back-board, which will be of pine, 14 inches wide, $\frac{1}{2}$ inch thick, and of length same as inside width of body. This board will slip down between two cleats at each end, fastened by screws to upper and lower rail parallel and 1 inch apart. Lazy-back for driver's seat to be of best ash, 5 inches wide, $\frac{3}{8}$ inch thick, the ends to be fitted with two beveled iron hooks at each end, adjusted to drop into double-beveled iron sockets fastened to the front bow on each side.

INTERIOR OF DRIVER'S BOX to be divided in two unequal parts by a $\frac{3}{8}$ -inch partition of pine, sliding between cleats on front and back of box, 15 inches from left side of body. A keg of oak, 16 inches long, 10 inches diameter at center, and 9 inches at either end, bound with eight (8) brass hoops $\frac{1}{2}$ inch wide, and supported by neat rests and steadied by cleats screwed on the inside of the top. A circular aperture to be made in left upper panel near the front, through which the outer end of the keg will project one inch. The rests to be arranged so as to prevent breakage or straining panel.

TOE-BOARD of best oak, 1 inch thick, $10\frac{1}{2}$ inches wide, 4 feet $\frac{1}{2}$ inch long, notched into main sills $\frac{1}{2}$ inch, secured by screws to center cross-bar, and to sills by three bolts in each end. Toe-board to be set 1 inch from front-bar and to have a toe-rail of $\frac{3}{8}$ -inch half-round iron projecting 5 inches and raised $2\frac{1}{2}$ inches, having four stay-bars carried across and secured to toe-board by three bolts in each stay. The bolts in the two end-stays to be carried through the main sills, and will have a roughened step, 4 inches wide by $\frac{1}{2}$ inch thick, welded on the stay-bar. The flat side of the toe-rail also will be roughened.

PARTITION.—A partition to be made in the body, forming an extension of and above the lower front panel, by a pine board 14 inches wide and $\frac{1}{2}$ inch thick, held in place by two parallel cleats on each side of each end, to be 1 inch apart and screwed to top and bottom rail.

INSIDE SEATS to be of white pine $\frac{3}{8}$ inch thick, two on each side, 3 feet 2 inches long, 14 inches wide, to be held in position by two leg-irons on front of each seat, which are riveted to a projection of strap-iron, which is fastened across the width of the seat, 6 inches from either end to center; bottom of leg-iron to enter hole in plate screwed to the bottom of body. Leg-irons $\frac{1}{2}$ inch diameter. Back part of seat to be screwed to main sill by two dovetail hooks on each seat at ends of the cross-irons, these hooks to enter angle-plates, which last to be let into and screwed to main sills, as shown by drawings. Cross-irons to have an additional dovetail hook in the middle of the seat, which, when hung on angle-plates into main sill, will cause the seats to form cushions against sides of body.

INSIDE RESTS OR LAZY-BACKS 6 feet 6 inches long, $3\frac{1}{2}$ inches wide, and $\frac{1}{2}$ inch thick, of best poplar, shall be secured along top edge of upper panel, commencing from back end of body.

STEP IN REAR, of oak, 3 feet long, 8 inches wide, 1 inch thick, set as shown in drawing, $11\frac{1}{2}$ inches below bottom of back-bar, and secured to it by two 1-inch oval iron stays, flattened and carried under full width of step $2\frac{1}{2}$ inches from ends. To have 1-inch oval iron braces full width of step, and extending to bottom sills, secured to them in rear of spring-bar with one bolt each; to have a center-brace of 1-inch oval iron,

full width of step, extending to hind cross-spring, with bolt through spring and spring-bar.

Bows.—Five bows, of best ash, $1\frac{1}{2}$ inches wide, $\frac{3}{8}$ inch thick, passing through iron staples on upper rails, with tenons at either end to fit into staples on lower rails. Top flat with rounded corners. Height from upper surface of floor to ridge-pole 4 feet 6 inches. Front bow immediately back of driver's seat, back bow set $2\frac{1}{4}$ inches forward of the inside of the tail-gate, and the top inclined back so as to hang exactly plumb with back of tail-gate. Of the intermediate bows the first is set 2 feet $2\frac{1}{2}$ inches from the front bow, and the others at interval of 2 feet.

RIBS.—Four half-bows, or ribs, to be equidistant between full bows and attached to ridge-pole and curtain-rails by brass loops, one loop secured to either side of each bow and rib 7 inches from top of bows, and fastened by two screws to inside of bows. Brass loops on the front bow to be made tapering, smaller at front, to prevent curtain-rails from passing beyond front bow.

CURTAIN-RAILS., 1 inch diameter, of best ash, to pass through loops or bows and extend from front to back bows, to be held in position by thumb-screws through loops on back bows.

RIDGE-POLE of ash, 1 inch wide, $\frac{1}{2}$ inch thick, to extend from front to back bow, and passing through brass loops, to be screwed to center of each bow and rib on the inside, and fastened at back end with thumb-screw, the same as the curtain-rails. The upper staples shall have openings a trifle over $1\frac{1}{2}$ inches for bows to pass through into lower staples, with openings 1 inch by $\frac{3}{8}$ inch.

WHIP-SOCKET.—A whip-socket to be provided and screwed on right upper panel near driver's seat.

TRIMMINGS AND UPHOLSTERY.

SEAT-TRIMMINGS.—Inside seats to be upholstered with best curled hair and russet leather of good quality $1\frac{1}{2}$ inches high.

LAZY-BACK TRIMMINGS.—Lazy-backs are upholstered same as seats. A cushion to fit driver's seat of same material and upholstered 3 inches high.

TOP AND CURTAINS to be of No. 6 cotton duck. The top to be fastened to the bows just above the curtain-rails on either side by nine brass staples with straps, one to each bow and rib, overlapping curtains 2 inches. Four curtains on each side to lap over upper panel 3 inches, and secured by nine wire staples and straps to rail, also by staples and straps in each bow in center of each curtain edge. Front and back curtains to be securely stitched to front and back edge of top, and wide enough to lap around corners of front and back bows and fasten to staples which secure first and fourth curtain, also fastened to driver's seat and tail-gate by four staples and straps; all curtains to have circular stay pieces of good leather, well stitched to the canvas opposite each staple, and roll-up straps with hole in end to take staple on each rib.

RUNNING-GEAR.

WHEELS.—Back 4 feet 2 inches, front 3 feet 6 inches, high, without tire. Hub of best elm, $6\frac{1}{2}$ inches diameter at center, $5\frac{1}{2}$ inches at back, and $4\frac{1}{2}$ inches at front, 9 inches in length, with iron bands at each end, mortised for 12 spokes front and 14 spokes back; mortises $1\frac{1}{2}$ inches by $\frac{3}{8}$ inch, with $\frac{1}{2}$ inch stagger; spokes $1\frac{1}{2}$ inches, of best seasoned white oak; felloe-tenons $\frac{3}{8}$ inch diameter; rims $2\frac{1}{4}$ inches deep, 12 inches on tread, two pieces for each wheel, best seasoned white oak. Tire of steel, $1\frac{1}{2}$ inches wide, $\frac{5}{8}$ inch thick, fastened on with tire-bolts between each spoke; two felloe-plates in each wheel over joints of rim.

Axes of best quality of refined iron $1\frac{1}{2}$ inches, left square 7 inches from each collar-washer, then $5\frac{1}{2}$ inches octagon balance round. The spindles to be of a thickness as will admit of their proper play in the boxes.

COLLAR-WASHER $2\frac{5}{8}$ inches in diameter, $\frac{3}{8}$ inch thick.

AXLE-BOXES of best foundry-iron, $7\frac{1}{2}$ inches long, $1\frac{1}{2}$ inches butt, $1\frac{1}{2}$ inches point, with two lugs 2 inches long, $\frac{1}{2}$ inch high. Oil-chamber 2 inches long, $\frac{1}{16}$ inch deep. Weight of box to be not less than $4\frac{1}{2}$ pounds, axles to be so arranged as to track 5 feet from center to center of wheels. Front axle to have 2 inches upward curve at center, and back axle an upward curve of 1 inch.

SPRINGS.—Platform of No. 3 steel, English, oil-tempered. Two front side-springs 43 inches long, $1\frac{1}{2}$ inches wide, seven plates; one front cross-spring 46 inches long, $1\frac{1}{2}$ inches wide, 7 plates, connected to back ends of side-springs with rubber hanger. Also gun tubing for ends of the springs, outside diameter of which must be 1 inch. Two hind side-springs 50 inches long, $1\frac{1}{4}$ inches wide, 7 plates, the front end resting between two iron lugs on plates securely bolted to bottom sill, and to have proper rubber blocks on top fastened by leather straps. This plate is made long enough to form half journal for brake-bars. Hind cross-spring 46 inches long, $1\frac{1}{2}$ inches wide, 7 plates, attached to side-springs with rubber hangers and fastened to body with oak bar 4

inches long, $1\frac{1}{2}$ inches wide, 3 inches deep in center and $\frac{1}{2}$ inch at either end. One $\frac{1}{2}$ -inch bolt passing through ends of bar and through lower sills 10 inches from back end. The spring is screwed to the bar by two $1\frac{1}{2}$ -inch half-oval wrought-iron clips.

RUBBER HANGERS.—The rubber couplings or hangers to consist of an iron ring $2\frac{1}{2}$ inches diameter, $1\frac{1}{2}$ inches wide, into which is forced a rubber ring $2\frac{1}{4}$ inches diameter, $2\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick. The hind ends of side-springs are made half round, with $\frac{1}{2}$ -inch iron staples on top to keep the hanger in position. The hind side-springs are set on wood blocks 6 inches long, 1 inch deep, secured by two clips each of $\frac{1}{2}$ -inch square iron. The front cross-spring is clipped to a wood block 18 inches long, $3\frac{1}{2}$ inches deep, $1\frac{1}{2}$ inches wide. The block is clipped to futchells at either end with $\frac{1}{2}$ -inch half-oval iron clips flattened on top. The front springs are clipped to front axle in the same manner over blocks $2\frac{1}{2}$ inches deep. All clips of best iron, and to pass through iron plates $\frac{1}{2}$ inch thick and 1 inch wide, to serve as washers.

All springs to have 5 inches sweep.

FUTCHELLS $2\frac{1}{2}$ inches long (or of a sufficient length to suit the springs, including 18 inches for jaws), $1\frac{1}{2}$ inches thick; from back of futchell-bed the futchells are reduced to a thickness of $1\frac{1}{2}$ inches. Side-bars and splinter-bar, $1\frac{1}{2}$ inches square, with a 1-inch oval iron rod extending from splinter-bar to back of futchells, passing under and bolted to futchell-bed, front end flattened and bolted to futchell, back end welded to a piece of iron $1\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, which passes under the fifth wheel and terminates at end of futchells. Futchells to have iron plates on inside of jaws $\frac{1}{2}$ inch thick, $\frac{1}{2}$ inches wide, 18 inches long, and secured to jaw with screws.

FUTCHELL-BED $3\frac{1}{2}$ inches deep, $2\frac{1}{2}$ inches wide, 31 inches long, including $1\frac{1}{2}$ inches finish on either end; iron plate $\frac{1}{2}$ inch thick bolted on under side full length and width of bed. Transom-plate $2\frac{1}{2}$ inches long, $2\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, secured by two $\frac{1}{2}$ -inch bolts with countersunk heads passing through bed and plate, with hole to receive a $\frac{1}{2}$ -inch king-bolt in the center plate to be grooved to receive upper transom-plate of same size as transom-plate of futchell-bed, thus preventing breaking of king-bolt.

CHAIRS, or upper platform bars, consist of three bars 4 feet 5 inches long, center-bars (which must have king-bolt plates $8\frac{1}{2}$ inches long) $2\frac{1}{2}$ inches at center and tapering to 2 inches at ends. Front and rear bars $1\frac{1}{2}$ inches thick; all three bars to be 6 inches deep at center and cut away by degrees to reach the depth of $1\frac{1}{2}$ inches at the ends. Three bars framed across upper platform bars, running from front to back bar, one bar to rest opposite center of body and one to rest opposite each side. These bars are fastened to body by $\frac{1}{2}$ bolt, passing through sills and bars at either end; center-bar is bolted at either end to body with $\frac{1}{2}$ -inch bolts; also bolted to back and front upper platform bars with $\frac{1}{2}$ -inch bolts. Bars to be cut out between the bearings, as per drawing. The upper transom-plate is to be secured by two bolts with countersunk heads passing through center-bar of upper platform.

FIFTH-WHEEL.—Two circles of iron 30 inches diameter, $1\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, with iron hoops $\frac{1}{2}$ inch wide, $\frac{1}{2}$ inch thick, shrunk on outer edge of upper half to receive lower half. The lower half is screwed to futchells and futchell-bed with intervening wood blocks by six bolts with countersunk heads. The upper half is secured to chairs by six bolts with countersunk heads.

SIDE-BARS, $1\frac{1}{2}$ inches square, mortised into futchell-bed and splinter-bar, to have iron plates $\frac{1}{2}$ inch thick, full length and width of bars, securely bolted to them and welded to plates under splinter-bar and futchell-bed.

SPLINTER-BAR, 4 feet 4 inches long, $1\frac{1}{2}$ inches deep, $1\frac{1}{2}$ inches wide, to rest on top of futchells 2 inches from front end, with 1-inch oval-iron bar flattened at the ends full length of bar, passing under futchells, which bolt to splinter-bar and futchell. This iron to have two lugs on outside of futchells to hold them in place and to drop $1\frac{1}{2}$ inches below futchells, and arranged for a half-elliptic spring to which the single-trees will be attached, to have on top of splinter-bar an iron plate 1 inch wide, $\frac{1}{2}$ inch thick, extending 15 inches from ends and 8 inches on side-bar, securely bolted to each. Splinter-bar to have 3 inches diameter roughened step on either end.

TONGUE, OR POLE, to be $3\frac{1}{2}$ inches wide at front of jaws and $2\frac{1}{2}$ inches at back end, 2 inches thick, 9 feet 6 inches long from futchell to extreme front end, $1\frac{1}{2}$ inches square at front end, with goose-neck and strap loops of $\frac{1}{2}$ -inch round iron flattened at ends to 1 inch by $\frac{1}{2}$ inch, and not less than 7 inches long, bolted to front end of pole by two $\frac{1}{2}$ -inch bolts.

SINGLE-TREES 34 inches long, $2\frac{1}{2}$ inches by $1\frac{1}{2}$ inches in center, $1\frac{1}{2}$ inches at ends, with $\frac{1}{2}$ -inch iron staple at center passing through and fastened with screw and nut. Single-trees to be of best hickory, and fastened to an iron rod from the half-elliptic spring back of splinter-bar by a swivel attachment of iron from the ends of spring to center of single-trees with ferrules $1\frac{1}{2}$ inches long and rings of $\frac{1}{2}$ -inch iron $1\frac{1}{2}$ inches diameter; cock-eyes 3 inches long, $\frac{1}{2}$ inch diameter, with thread on the end that enters the single-tree. The half-elliptic spring above referred to is to be $1\frac{1}{2}$ inches wide, 42 inches extreme length, having 5 plates No. 3 English oil-tempered steel.

Brake.—A horizontal transverse 1-inch round-iron bar 4 feet 8 inches long passing through a journal formed by part of spring-hanger, before referred to, and secured to

body by a lower half-journal, with bolts passing through both journals and bottom sill. To either end of the transverse bar is welded a flattened curved bar of iron, averaging 1 inch by $\frac{1}{2}$ inch thick. On the right side it has an arm extending upward at right angles to main sill, and is jointed to a longitudinal iron rod $\frac{1}{2}$ inch diameter, and extended to and jointed to a lever near the front end of body. The lower arms on both sides are somewhat curved outwardly and arranged to receive rest-blocks $\frac{1}{2}$ inches long, $2\frac{1}{2}$ inches wide, $2\frac{1}{2}$ inches thick, and fastened as shown in drawing.

BRAKE-LEVER.—The lever consists of an iron curved bar on the right side 1 inch wide, $\frac{1}{2}$ inch thick, ending below in an eye to receive a fixed bolt which is securely attached to the outside upper platform bar between the sill and top platform bars. The lever is 18 inches high, and terminates above in a foot-rest bent and forming a slightly concave surface. The longitudinal already described is jointed to the lever through an eye 5 inches above the fixed bolt and is of such a length that the lever will be vertical when not in use.

STRETCHER-REST.—A stretcher-rest to be provided on the floor of the wagon, constructed in the following manner: Two light half-elliptic springs of two plates each, $1\frac{1}{2}$ inches wide, set 2 feet 7 inches center to center on each side of wagon; the springs hinged at one end to a shoe secured to the floor by two $\frac{1}{2}$ -inch bolts. The other end will have a roller $2\frac{1}{2}$ inches diameter by $1\frac{1}{2}$ inches wide, to run on roller-plate let into floor and secured to it by screws. The springs to sustain a roller-bar $\frac{1}{2}$ inch by $1\frac{1}{2}$ inches, and 6 inches long, having three double tapered ash rollers 2 inches diameter, placed as per drawing, having iron rings at ends 1 inch by $\frac{1}{2}$ inch.

PAINTING.

PAINTING.—All parts of the wood-work of the body, with the exception of the bows, ribs, ridge-poles, and curtain-rails, will be painted dark olive-green. A first coat of heavy boiled linseed-oil will be laid on hot; when this priming is thoroughly dry, three successive coats of the olive-green paint will be laid on, mixed with boiled linseed-oil, without admixture of turpentine or varnish. Sufficient time for drying of each coat will be allowed. All iron work will be painted black, with three (3) coats of lead paint mixed with boiled linseed-oil. On the panels of the upper section, midway between the second and third bows from the front, the letters U. S., 6 inches in height, will be conspicuously painted in bright yellow, of the tint of the hospital flag. On the panels, between the first and second bows, the red Geneva or Greek cross will be painted on a white ground. All the wood-work of the running-gear will be painted in the same manner as that of the body of the wagon.

GENERAL PROVISIONS.

GENERAL PROVISIONS.—Spokes and wheel-boxes to be well wedged; all tenons to be secured with wooden pins, except those of bows; all welds to be made smooth and strong. Corners of felloes to be rounded between spokes; lower studs and sills to be chamfered and neatly finished; all clips to be neatly finished with cross-tie washers 1 inch by $1\frac{1}{2}$ inches; sharp corners of bows to be removed; coverings of seats and lazy-backs to be well fastened. All wood and iron work to be of best material; sills, cross-bars, studs, rails, foot-boards of body to be of best seasoned white oak; frame-work of upper section of body, bows, lazy-back, curtain-rails, and cleats to be of best seasoned ash; all panels to be of best seasoned yellow poplar; wood-work of running-gear to be of best hickory.

PARTS TO BE INTERCHANGEABLE.—The ambulance wagon is to be so constructed that the several parts of one wagon will be interchangeable with any other wagon, so as to require no numbering or arranging for putting together, and the work in all its parts executed in the best workmanlike manner.

PACKING.—The wagon may be prepared for packing by removing the front-board, the top and back of driver's seat, front lazy-back, curtain-rails, ridge-pole, and bows, which will allow the upper panels to lay on the tail-gate and front-bar, and all can be packed inside of lower part of body.

WAR DEPARTMENT, QUARTERMASTER-GENERAL'S OFFICE,
Washington, D. C., January 12, 1878.

(See drawings, marked C, prepared by Bauman.)

ADJUTANT-GENERAL'S OFFICE,
Washington, D. C., November 3, 1877.

SIR: I have respectfully to inform you that the Secretary of War has approved the report of the Board of which you are president, and directed that the recommendations contained therein be carried into execution.

Copies of the report have this day been furnished the Quartermaster-General and Surgeon-General.

I am, sir, very respectfully, your obedient servant,
(Signed)

E. D. TOWNSEND,
Adjutant-General.

Col. T. L. CRITTENDEN,
Seventeenth Infantry, President Board on Ambulances, Washington, D. C.

NOVEMBER 9, 1877.

A meeting of the members of the Board on Ambulance Wagons was held at the office of the Quartermaster-General and at the Ebbitt House.

Lieut. Col. H. C. Hodges called attention to the letter, of November 3d, of the Adjutant-General to the President of the Board announcing that the recommendations of the Board were approved, and that copies of the report had been furnished the Quartermaster-General and Surgeon-General. Colonel Hodges stated that the papers with regard to the construction of the fourteen ambulance wagons had been placed on the Quartermaster-General's desk. Advertisements would not be issued until the Army appropriation bill was passed.

The Board directed the Recorder to contract with Mr. McDermott for a set of working drawings of the several parts of the pattern of the new ambulance wagon, and Lieut. Col. H. C. Hodges and Assistant Surgeon G. A. Otis were directed to draw up a revised set of specifications as a guide for the construction of the new pattern. The same officers were instructed to confer with John McDermott & Co., and to prepare drawings and models of a hand stretcher and litter adapted for use in the new ambulance wagon, and susceptible of being used as well in other modes of transportation, either by railway or on shipboard, in ordinary wheel vehicles, barrow fashion, on a single pair of wheels, or on pack animals; in short, to devise a convenient form of field-stretcher for all the various conditions in which such an appliance is required. The President announced that the Board would be reconvened when these plans were ready for discussion.

(Signed)

T. L. CRITTENDEN,

Colonel Seventeenth Infantry, President of the Board.

(Signed)

GEORGE A. OTIS,

Assistant Surgeon U. S. Army, Recorder of the Board.

NOVEMBER 13, 1877.

Assistant Surgeon George A. Otis on this day held a consultation with Mr. McDermott in regard to the construction of the litters or hand stretchers adapted to the new ambulance wagon. The extreme available space on the floor of the ambulance was an area of seventy-eight (78) inches in length by forty-four and a quarter (44 $\frac{1}{4}$) inches in width. It was decided that the extreme admissible width of the stretcher must not exceed twenty-two (22) inches, and the length seventy-six (76) inches; that the two side-poles should be of ash, one and three-quarter (1 $\frac{3}{4}$) inches square. It was determined that experiments should be made of preparing the wood by boiling it in linseed-oil. It was decided to provide telescopic handles, either of lignum-vitæ or of iron tubing, and that the handles when drawn out should have an available length of ten inches, with a spare inch from the handles at each end to the margin of the canvas sacking. The latter should be six (6) feet in its extreme length, and twenty-four inches in its width, one inch being turned down on each side so as to leave the canvas sacking exactly twenty-two (22) inches in width. It was decided to use the iron brackets employed in the Halstead field-stretcher, as traverses to keep the side-poles separate; but that experiments should be made of forming these of steel or wrought iron, and to countersink the rivets to the side-poles, so that the traverses should not be in the way in rolling the litters into the wagon. Plans were also discussed for the disposition of the legs. It was decided that it would be best to make these of ash, braced as in the Halstead litter, and not as high as in the latter. It was thought that legs maintaining the side-poles eight (8) inches from the ground were amply long. Various plans of details in the attachment of handles by means of U-shaped pieces of iron were considered, and a plan perfected for the model-maker to work by.

(Signed)

T. L. CRITTENDEN,

Colonel Seventeenth Infantry, President of the Board.

(Signed)

GEORGE A. OTIS,

Assistant Surgeon U. S. Army, Recorder of the Board.

DECEMBER 13, 1877.

The Board of Officers on Ambulance Wagons met this day at 11 o'clock a. m., at the manufactory of John McDermott & Brothers, 310 Pennsylvania avenue, pursuant to the call of the President; all the members being present. The Board inspected the ambulance wagon, and particularly examined a proposed new stretcher prepared by Mr. John McDermott, under instructions from Dr. Otis, and the running-gear and springs for supporting the litter, and also the means for securing and shifting the seats. The various modifications in the seats and litters and some minor alterations in the arrangement of the hinges and dimensions of the studs were explained and approved. At 12 o'clock noon, the members of the Board repaired to the Surgeon General's Office, where Quartermaster-General Meigs was present by invitation, and also Surgeon-General Barnes and Assistant Surgeon-General Crane and General McCook. The ambulance wagon was thoroughly inspected, and the stretcher-bearers went through with their drill, handling the stretcher in raising and placing a man in position in the wagon while recumbent. The patient was then removed, and the ambulance men exhibited the method of taking the parts of the ambulance wagon apart and reassembling them with creditable promptitude. The members of the Board then accompanied the Surgeon-General to the War Department, where the honorable Secretary of War and General Sherman thoroughly inspected the working of the ambulance and all the details of the accessory appliances. At 2 o'clock the Board adjourned, subject to the call of the President.

(Signed)

T. L. CRITTENDEN,

Colonel Seventeenth Infantry, President of the Board.

(Signed)

GEORGE A. OTIS,

Assistant Surgeon U. S. Army, Recorder of the Board.

WASHINGTON, February 26, 1878.

The Board met pursuant to the call of the President; all the members being present.

The President stated that the object of this meeting was to examine and revise the specifications and drawings of the patterns of ambulance wagon that had been decided on to be recommended for Army use.

The President stated that the alterations required in the model constructed under the supervision of the Board by Messrs. J. McDermott & Bros. had been agreed upon, and that this sample wagon had been inspected and approved by the Quartermaster-General, Surgeon-General, and others, and that the Quartermaster's Department had issued proposals for a certain number of ambulance wagons of the pattern to be tested in actual field service.

After going over the specifications *seriatim*, the Board decided to approve the specifications, with the modifications last decided upon, and that the minutes and correspondence and the specifications and drawings should be transmitted to the honorable the Secretary of War.

In reporting the completion of their task, the Board would respectfully call attention to its conviction that the plan proposed embraces some important improvements, and has surmounted some great obstacles: To make the vehicle turn readily and safely in narrow roads and at the same time to lower the height of the floor from the ground and afford the maximum of floor space; to restrict the weight, yet insuring sufficient strength; to arrange for the comfortable carriage of men in either the sitting or recumbent posture; and, finally, the method for securing compactness in packing and shipping. These are a series of important advantages which it is believed have been attained and secured, with a strict regard to economy and durability of construction.

(Signed) T. L. CRITTENDEN,
Colonel Seventeenth Infantry, President of the Board.

(Signed) HENRY C. HODGES,
Lieutenant-Colonel, Quartermaster's Department.

(Signed) GEORGE A. OTIS,
Assistant Surgeon, U. S. A., Recorder of the Board.

LIST OF APPENDICES TRANSMITTED WITH THE REPORT OF THE BOARD ON AMBULANCE WAGONS.

1. Letter from Lieut. Col. J. A. Ekin, relative to Army ambulance to be constructed at Alleghany City, Pa.
2. Specifications of different ambulances, transmitted by Quartermaster-General M. C. Meigs.
3. Communications from Quartermaster-General M. C. Meigs, referring to a model of body of ambulance wagon and to patterns of different wheels at the depot quartermaster's.
4. Weights of different ambulance wagons.
5. Telegram giving weight of ambulance in course of construction at Pittsburgh Wagon Works.
6. Specifications of ambulance, prepared by Lieut. Col. J. A. Ekin, forwarded by Maj. M. I. Ludington.
7. Papers pertaining to patent hubs, wheels, and springs.
8. Weight of ambulance constructed at Jeffersonville, Ind., transmitted by Maj. M. I. Ludington.
9. Plans and specifications of ambulance to be constructed at Alleghany City, Pa., transmitted by the Quartermaster-General.
10. Letters from Col. P. V. Hagner from August 16 to October 25, 1875, inclusive.
11. Communication from Mr. H. N. Jasper concerning his "Manumotive bullet-proof ambulance convertible into a portable rifle-pit."
12. Letter of Col. P. V. Hagner, dated January 10, 1876.
13. Various communications laid before the Board January 20, 1876.

DRAWINGS ACCOMPANYING THE REPORT.

- A.—Drawings prepared from original specifications for wagon to be built at Watervliet.
 B.—Drawings of ambulance as built at Watervliet Arsenal, showing modifications in original specifications.
 C.—Drawings of ambulance built at Washington by Messrs. McDermott Brothers, under the supervision of the Board.
-

APPENDIX 1.

JEFFERSONVILLE DEPOT OF THE QUARTERMASTER'S DEPARTMENT,
Jeffersonville, Ind., March 27, 1875.

GENERAL: I have the honor to inform you that there are now in course of preparation at this depot plans and specifications of an Army ambulance, being one of the twenty-five to be constructed under contract at Alleghany City, Pa., by the Pittsburgh Wagon Works.

These specifications, with the exception of slight modifications, have been approved by the Quartermaster-General of the Army, and so soon as prepared will be forwarded for the consideration of the Board of officers directed under a recent order of the War Department to convene at Washington, D. C., to examine and report upon the ambulances now used in the Army.

I would respectfully suggest that when the Board adjourns it be to meet at Alleghany City for the purpose of examining and reporting upon the style of ambulance to be there constructed.

Due notice will be given of the time when the ambulance will be ready for inspection.

Very respectfully, your obedient servant,
(Signed)

JAMES A. EKIN,

Deputy Quartermaster-General U. S. A., in charge of Depot. /

The QUARTERMASTER GENERAL OF THE ARMY,
Washington, D. C.

[Indorsement.]

WAR DEPARTMENT, QUARTERMASTER-GENERAL'S OFFICE,
Washington, April 1, 1875.

Respectfully referred to Col. R. Ingalls, Acting Quartermaster-General, President of the Board, to decide upon the pattern and prepare specifications for Army ambulance, convened by paragraph 4, Special Order No. 44, War Department, Adjutant-General's Office, March 16, 1875.

By order Quartermaster-General.

(Signed)

M. I. LUDINGTON,
Quartermaster, United States Army.

APPENDIX 2.

WAR DEPARTMENT, QUARTERMASTER-GENERAL'S OFFICE,
Washington, D. C., March 31, 1875

COLONEL: Referring to paragraph 4, Special Orders No. 44, War Department, Adjutant-General's Office, March 16, 1875, I respectfully transmit herewith—1st. Two sets of specifications for two-wheeled ambulances; 2d. Specifications for "Tripler's" ambulance; 3d. Specifications for the "New Coolidge ambulance;" 4th. Specifications of the ambulance known as the Wheeling pattern; 5th. Specifications of ambulance known as the Rucker pattern; 6th. Specifications for ambulance prepared at Jeffersonville, depot of the Quartermaster's Department, under authority from this office dated January 25, 1875; 7th. "Treatise on Military Carriages and other Manufactures of the Royal Carriage Department," Great Britain. It is requested that this book be returned to this office as soon as it is done with.

There is also inclosed herewith a tracing prepared in this office of a Rucker ambulance. Please return with report of the Board all the inclosed papers.

Very respectfully, your obedient servant,

(Signed)

M. C. MEIGS,

Quartermaster-General, Brevet Major-General, U. S. A.

Col. RUFUS INGALLS,

Acting Quartermaster-General U. S. A.,

President of Board to decide upon the pattern

and prepare specifications for Army ambulances,

Washington, D. C.

Ambulance known as the Rucker pattern.

AMBULANCE BODY.

Body, 8 feet 6 inches long exclusive of foot-board; sills of body projecting out in front 13 inches for foot-board; sills, $2\frac{1}{2}$ inches wide by $1\frac{1}{2}$ deep; foot-board 11 inches wide, made of 1-inch ash, and fastened with screws to sill, with iron plate on top at each end; five cross-bars in bottom frame of body—front-bar $2\frac{1}{2}$ inches wide by $1\frac{1}{2}$ inches deep, middle-bars 2 inches wide by $1\frac{1}{2}$ inches deep, back-bar $1\frac{1}{2}$ inches wide by 2 inches deep, with iron brace to stud; center sill in bottom running from back-bar to second bar from front, $2\frac{1}{2}$ inches wide by $1\frac{1}{2}$ inches deep; two short bars, $1\frac{1}{2}$ inches square, running from back-bar to second bar from back, at equal distance from center bar to sills; width of body, 4 feet 2 inches from out to out of frames; bottom, $\frac{1}{2}$ inch planed pine boards; seven studs on side of body—the four bows, mortised in sills of body, make part of the seven studs; bows, $1\frac{1}{2}$ inches wide by $1\frac{1}{2}$ inches thick, forming studs $1\frac{1}{2}$ inches wide by $\frac{1}{2}$ inch thick; the other studs are $1\frac{1}{4}$ inches wide by $\frac{1}{2}$ inch thick; middle rail $1\frac{1}{2}$ inches wide by 1 inch deep; depth of body from bottom of sill to top of middle rail, $15\frac{1}{2}$ inches; lower panels are walnut, 11 inches deep by $\frac{1}{2}$ inch thick, put inside of studs; middle panel, 8 inches wide by $\frac{1}{2}$ inch thick, of walnut; top panel, ash, $3\frac{1}{2}$ inches wide by $\frac{1}{2}$ inch thick, with a groove for the middle panel to fit into; depth of body from out to out, 27 inches; four bows, $1\frac{1}{2}$ inches wide by $1\frac{1}{2}$ inches thick; top 4 feet 10 inches high from inside of bottom to bottom of ridge-pole; from top of upper panel to curtain-rail, $25\frac{1}{2}$ inches; extra bows running from curtain-rails between the long bows; bonnet on front bow, 12 inches wide; tail-gate, whole width of body, with three studs and rail on top, with two hinges, and fastened with two spring-catches and boxes, so as to keep back end of body from spreading; a box in front end of body, with lid and two strap-hinges and hasp, the lid to rest on middle rails of body; two partitions

in box, with holes 7 inches in diameter, cut in side panels, for water-kegs; water-kegs, 16 inches long, 9 inches in center, and tapered to 7 inches at ends; lazy-back to front seat, fastened to top rail of body with irons; four lattice-blinds in center panels on each side, 10 $\frac{1}{2}$ inches long by 6 $\frac{1}{2}$ inches deep; the first lattice-frame is 21 inches from front of body, with 5 $\frac{1}{2}$ inches space between each frame—six pieces of lattice in each frame; one rail let into bows 1 $\frac{1}{2}$ inches wide by $\frac{1}{4}$ inch thick, 6 inches above upper panel.

AMBULANCE LITTERS.

One litter 6 feet 2 inches long, with handles extending 6 inches; divided into two parts; made with frame of ash, outside pieces 1 $\frac{1}{2}$ inches wide by 2 inches deep, inside pieces 1 $\frac{1}{4}$ inches wide by 1 $\frac{1}{2}$ inches deep, with four cross-pieces to match; one part is 12 $\frac{1}{4}$ inches wide and the other 9 $\frac{1}{2}$ inches, hinged together with four strap-hinges; pieces in frame-work $\frac{1}{2}$ inch thick and 18 inches long, hung on strap-hinges, to be raised as pillows in case of necessity; litter fastened on to body with eyes and pins; top litter 6 feet 8 inches long by 22 inches wide, framed and paneled; frame of ash, 3 $\frac{1}{2}$ inches wide by $\frac{1}{2}$ inch thick all around; three center cross-pieces 2 inches wide by $\frac{1}{2}$ inch thick, fastened on to body with iron slides and hinges with groove, and fastened with rivets or bolts; tops of litters to be covered with enameled leather and stuffed with curled horse-hair.

RUNNING-GEAR.

Running-gear with platform-springs; four side-springs 43 inches long by 1 $\frac{1}{2}$ inches wide; seven plates; two cross-springs 4 $\frac{1}{2}$ inches long by 1 $\frac{1}{2}$ inches wide; seven plates connected with couplings or hangers; back-springs attached to body with iron stays; side-springs are set on wooden blocks clipped to axle; front cross-spring rests on and is clipped to iron stay.

WHEELS.

Back wheels 4 feet 2 inches high; front wheels 3 feet 6 inches high; hubs (of best gum) 6 $\frac{1}{2}$ inches by 9 inches, with iron bands on each end; spokes (hickory) 1 $\frac{1}{2}$ inches; rims (hickory) 1 $\frac{1}{2}$ inches; two pieces for each wheel; tire, 1 $\frac{1}{2}$ inches wide by $\frac{1}{2}$ inch thick, fastened on with 8 tire-bolts in each wheel; two felloe-plates in each wheel, over joints; wood-work of running-gear of best seasoned hickory; futchells (or hounds) 1 $\frac{1}{2}$ inches thick, and length to suit the springs; side-bars and splinter-bars 1 $\frac{1}{2}$ inches thick; one futchell-bed 3 inches deep by 2 inches wide; pole 2 $\frac{1}{2}$ inches wide at futchells and tapering back to 2 inches at back end, 1 $\frac{1}{2}$ inches deep, 9 feet long from futchells to extreme end in front, 1 $\frac{1}{2}$ inches square at front end, with iron crab-hook and chains at front end of pole; swingle-trees 34 inches long, 2 inches in diameter in center, and 1 $\frac{1}{2}$ inches at ends; swingle-trees fastened on a half-elliptic steel spring back of splinter-bar by a swivel attachment of iron, from ends of spring to center of each swingle-tree, with ferrules and rings on each end of swingle-trees.

Steps on back of body 3 feet 9 inches wide, 1 inch thick, fastened on back-bar with iron stays and bolts 16 inches down from top of bar; three bars on top of fifth-wheel 1 $\frac{1}{2}$ inches wide, with thickness sufficient to raise the body to its proper level, and bolted to fifth-wheel with two bolts in each bar; iron axles, with nuts 1 $\frac{1}{2}$ inches square, 8-square, and round axle-boxes 7 $\frac{1}{2}$ inches long; track of wheels 5 feet from center to center; iron transom-plate on top of futchell-bar, 17 inches long by 2 inches wide, in center $\frac{1}{2}$ inch deep; plate on top center-bar 17 inches long by 2 inches wide in center, $\frac{1}{2}$ inch deep; each of these plates to be fastened with two countersunk bolts; iron plate on bottom of futchell-bar $\frac{1}{6}$ inch deep, and width to suit wood, and welded to plates running underneath side-hounds or brace, and continuing to splinter-bar, all to be bolted on with turned head-bolts; a plate of iron underneath splinter-bar 1 inch wide by $\frac{1}{2}$ inch thick, forming a stay underneath the futchells; a plate on top of splinter-bar 14 inches long by $\frac{1}{2}$ inch thick, and $\frac{1}{2}$ inch wide, forming a T, extending on top of side-hounds 5 $\frac{1}{2}$ inches long, fastened by five $\frac{1}{2}$ -inch turned head-bolts on iron stay extending from the top of futchells to top of splinter-bar, fastened with two bolts at each end; jaws of futchells 18 inches long to where they take the pole, and plated with iron 1 $\frac{1}{2}$ inches wide by $\frac{1}{2}$ inches thick; iron fifth-wheel 1 $\frac{1}{2}$ inches wide by $\frac{1}{2}$ inches thick, and 20 inches in diameter, fastened with six countersunk bolts in each bottom and top half (of fifth-wheel); a plate of iron on top of top center-bar, 1 $\frac{1}{2}$ wide by $\frac{1}{2}$ inch deep in center, and tapered to $\frac{1}{2}$ inch at ends; one stay, extending from front hanger-iron of back-spring to center of body, of $\frac{1}{2}$ -inch iron (round); a double-action brake, with lever-rods on both sides of body; two rubbing or lock plates on sides of body.

GENERAL FINISH.

All parts of wood-work of body running-gear to be oiled, one coat of oil and three coats of varnish, and all metal parts with two coats of paint and one of varnish; top of body covered with 12-ounce cotton duck; three curtains on each side, of same material, as also one back curtain, with roll-up straps of leather, fastened with copper rivets; also wire attachments for fastening curtains, in combination with leather patches sewed on curtains.

Ambulance known as the Tripler pattern.

Articles of agreement, made and entered into this — day of —, 1st, by and between —, quartermaster for United States Army, for and in behalf of the United States, and —, witnesseth:

First, it is agreed that the said —, — heirs and assigns, shall well and truly make, or have made, built, and delivered, as herein stated, — four-wheeled ambulances of the size and description as follows, to wit:

AMBULANCE (BODY).

SILLS 11 feet long, out to out (including foot-board), 3 $\frac{1}{2}$ inches wide, by 2 $\frac{1}{2}$ inches deep. The foot-board is 11 $\frac{1}{2}$ inches wide, made of 1-inch stuff, and fastened on the sills by 3 $\frac{1}{2}$ -inch bolts in each end; the sills are made at front end so as to incline the foot-board upward. There are 8 studs on each side, 1 $\frac{1}{2}$ -inch square; sides are solid panels of $\frac{3}{4}$ -inch boards, 30 inches high (with middle rail) from top of sill to top of rail on panels. There is a top rail about 4 $\frac{1}{2}$ inches above: this rail is fastened to the studs. The body is 8 feet 9 $\frac{1}{2}$ inches in length in the clear, from outside of tail-piece to box in front, and 4 feet wide in the clear; front or head board, 15 inches high, 5 feet high in center from floor to ridge-pole, and top made oval; 6 bows, 2 inches by $\frac{1}{2}$ inch, fastened to rails and studs with screws on outside.

In second lower panel, or 2 feet from front (on each side), there is a wicket-door 8 $\frac{1}{2}$ inches wide, and 14 $\frac{1}{2}$ inches long; this door is made to slide in a groove on inside; the seat for driver is made of the lid of box, with cushion; the box is 18 inches wide, 11 $\frac{1}{2}$ inches in the clear, with partition in the middle; the lazy-back is fastened to the lid of box, plain hand-lock on side, to which is attached an iron rod or lever alongside of body; to the lever is a strap by which the driver locks the wagon.

A middle bar, 3 $\frac{1}{2}$ inches by 2 $\frac{1}{2}$ inches, is bolted on sills, for the hind side-springs; 2 braces on tail end of body, reaching from tail-piece to top rail.

WATER-KEG, 3 feet 8 inches long, 13 inches in center, tapered to 10 inches at each end, which is supported by chain and hooks (17 inches long, including hooks), secured to sills by eyebolts; spigot on left-hand side of keg, directly under staples for hooks.

To have heavy canvas cover, No. 2 duck, 3 curtains on each side, and a front and back curtain to extend to bottom of body. The curtains are fastened by staples and pins; the front and hind bow rake out in front 12 inches, and back or hind 6 inches.

SPRINGS OF AMBULANCE.

BACK-SPRING, 4 feet 2 inches long from center to center; side-springs back 3 feet 10 inches center to center; front back-spring 4 feet 2 inches center to center; the cross-springs are 2 $\frac{1}{2}$ inches wide, 7 plates; the side-springs 2 $\frac{1}{2}$ inches wide by 6 plates; side-springs front 3 feet 10 inches long center to center.

AXLES, 1 $\frac{1}{2}$ square, turned edgewise with nuts on ends; boxes 8 $\frac{1}{2}$ long; 1 $\frac{1}{2}$ inches by 1 $\frac{1}{2}$ inches.

HIND WHEELS, 4 feet 8 inches high, without the tire; hubs 7 $\frac{1}{2}$ inches by 10 inches; spokes 1 $\frac{1}{2}$ inches by 2 inches at the shoulders; tire 2 inches wide and $\frac{1}{2}$ inch thick; felloes 2 $\frac{1}{2}$ inches deep.

FRONT WHEELS, 3 feet 8 inches high without the tire; hubs 7 $\frac{1}{2}$ inches by 10 inches; spokes 2 inches by 1 $\frac{1}{2}$ inches at the shoulder; felloes 2 $\frac{1}{2}$ inches deep.

HALF HOUNDS, 2 feet long; fifth-wheel, 2 feet diameter; 1 $\frac{1}{2}$ inches by $\frac{1}{2}$ inch.

WHOLE HOUNDS, 4 feet 4 inches long.

Three cross-bars on fifth-wheel, 2 inches square; cross-bar on front hounds, 4 feet 8 inches long. The steps on each side are fastened to this cross-bar.

DOUBLETTREES, 4 feet long, ironed same as omnibus as is also the whole running-gear.

TONGUE, 10 feet 6 inches long; 4 inches by 2 $\frac{1}{2}$ inches at front of hounds, and tapers to 2 $\frac{1}{2}$ inches square at back end; at front end it tapers to 1 $\frac{1}{2}$ inches round: a hook with eye in it goes on top of tongue to attach lead-bar for lead-horses; lead-bar same length as doubletree, made light.

LITTER OF AMBULANCE.

Six feet 7 $\frac{1}{2}$ inches long, 1 foot 10 inches wide; panels 4 $\frac{1}{2}$ inches wide, 1 $\frac{1}{2}$ inches thick, of poplar, and has a solid bottom; mattress is made of heavy oil-cloth, stuffed with curled hair; the cover is fastened to panels of litter by a leather binding and tacked all around.

The frame-work for upper litters is composed of 3 cross-strips, one at each end and one in the middle; one cross-piece on top on each side and two in the middle for tracks to run the litter in on. The tracks are made in the bottom as well as the upper, $\frac{1}{2}$ -

inch by $\frac{1}{2}$ -inch iron, and extend the whole length of body from inside of tail piece. There are 3 rollers on each side of litter-frame, with flange, same as the regular railroad-car wheels.

There are 4 litters for each wagon, 4 small pillows and 2 cushions, one for driver and one for back seat. On each side of the litter-frame there is an iron handle made to slip in and out. These handles are let in level with the litter-frame, 21 inches long, made to come out, say, 15 inches before being checked.

There is also a hook in each end of the frame to keep it in place when in the body, and fastens to a staple in the floor, let in so as to be nearly level: upper litters the same. The staple is put in the front and back cross-bar.

TAIL-BOARD is 15 inches wide by full 1-inch stuff, and, when down, rests on joint-hinges, forming a foot-board, supported, when down, by a leather strap 2 inches wide, which goes around the tail-piece at each end, between the panel and the braces; when up, it forms the tail-board. A movable seat goes in body back of litters, made of 1-inch boards and end pieces: the bottom is 18 inches wide, and board, to form lazy-back, 15 inches high. This has a cushion. The tail-board is fastened, when up, by hooks, secured to middle rail.

Each side of the body of the ambulance to be marked U. S.: all other parts to be lettered U. S.

It is agreed and distinctly understood that the ambulances are to be so constructed that the several parts of any one ambulance will agree and exactly fit those of any other, so as to require no numbering or arranging for putting together, and all the materials used for their construction to be of the best quality: all the wood thoroughly seasoned, and the work in all its parts faithfully executed in the best workmanlike manner.

The work may be inspected from time to time as it progresses, by an officer or agent of the Quartermaster's Department, and none of it shall be painted until it shall have been inspected and approved by said officer or agent authorized to inspect it. When finished, painted, and accepted by an officer or agent of the Quartermaster's Department, and delivered as herein agreed, they shall be paid for.

The ambulances are to be delivered at ——, at such place as the quartermaster or his agent may designate, and the contractor to assist in taking them apart for shipping. It is agreed that —— of the ambulances complete shall be ready for delivery on or before the — day of —, 18—, — on or before the — day of —, and the remainder on the — day of —, 18—.

In case of failure on the part of the contractors to make and deliver the work at the time aforesaid, and in the manner specified in this agreement, the quartermaster shall make good the deficiency by purchasing in open market, at the expense of said contractors.

It is agreed that the aforesaid ——, quartermaster U. S. A., for and in behalf of the United States, shall pay or cause to be paid to said contractors or — assigns the sum of — dollars for each ambulance, complete in all its parts as herein described, made and delivered agreeably to this contract.

It is expressly understood that no member of Congress shall be admitted to any share or part in this contract or any benefit to arise therefrom directly or indirectly.

In witness whereof we have hereunto set our hands at —, this — day of —, 18—.

*Specifications for ambulance prepared at Jeffersonville under authority of January 25, 1875,
from Quartermaster-General's office.*

BODY.

Length, exclusive of foot-board, 7 feet 10 inches; width, 4 feet 2 inches from out to out of frame; depth, $2\frac{1}{2}$ inches from top of upper panel to bottom of sill; height of body from ground to bottom of sills, 3 feet $2\frac{1}{2}$ inches.

SILLS., 8 feet 11 inches long from out to out (projecting 13 inches for foot-board), $2\frac{1}{2}$ inches wide, $1\frac{1}{2}$ inches deep.

FOOT-BOARD., 11 inches wide, of 1-inch ash, to rest on sills; to have a $\frac{1}{2}$ -inch round foot-iron, projecting 4 inches and raised 2 inches, with stay-iron in center; foot-iron to be secured to sills with three (3) bolts at each end, to pass through foot-board.

CROSS-BARS.—To have five (5) cross-bars in frame of body, mortised into sills; front-bar $2\frac{1}{2}$ inches wide, $1\frac{1}{2}$ inches deep; back-bar $2\frac{1}{2}$ inches wide, $2\frac{1}{2}$ inches deep, and to project on either side for stud braces to rest on; middle and central bars 2 inches wide, $1\frac{1}{2}$ inches deep; to have one additional center-bar $2\frac{1}{2}$ inches wide, $2\frac{1}{2}$ inches deep, notched $\frac{1}{2}$ inch for sills, and projecting same as back-bar for stud braces and rest for hind side-springs.

STUDS.—To have seven (7) studs in frame of body on each side (the bows mortised

into sills forming part of the seven studs) and three (3) in front, $1\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, and extending to top of middle panel.

MIDDLE RAIL. 11 inches above top of sill, to be $1\frac{1}{2}$ inches wide, 1 inch deep, the frame-work of body to be best quality white oak, thoroughly seasoned.

PANELS.—Lower panel of clear yellow poplar, $\frac{1}{2}$ inch thick, 11 inches wide, put inside of bows and studs; middle panel of material similar to lower, $\frac{1}{2}$ inches wide, put on outside of bows and studs, and securely fastened to them with screws; top panel of ash, $\frac{1}{2}$ inch thick, $3\frac{1}{2}$ inches wide, with groove for middle panel to fit into, secured to bows same as middle panel. All panels to project the proper distance; upper panel to have a $\frac{1}{4}$ -inch molding on top to make a finish.

FLOOR, of $\frac{1}{2}$ -inch white pine, dressed.

BOWS.—Four (4) in number, of ash, $1\frac{1}{2}$ inches wide, $1\frac{1}{2}$ inches thick, mortised into sills of body, forming studs $1\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick: height, from top of floor to bottom of ridge-pole, 4 feet 6 inches; top flat, with rounded corners.

RIBS, of ash, equidistant between bows, 1 inch wide, $\frac{1}{2}$ inch deep, to be securely fastened to curtain-rail with screws.

CURTAIN-RAIL, of ash, $1\frac{1}{2}$ inches wide, $1\frac{1}{2}$ inches thick, to commence at the spring of the bows; bows and ribs to be let into the rail flush, $\frac{1}{2}$ inch being taken off thickness of bows; to be fastened to the bows with screws.

RIDGE-POLE, of ash, $1\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, let in flush, $\frac{1}{2}$ inch being taken off bows; to be fastened to bows with screws.

BONNET, 12 inches wide; frame of $\frac{1}{2}$ -inch round iron, riveted to front bow, with brace in center screwed to ridge-pole; trimmed same as ambulance top.

BRACES.—Stud braces of $\frac{1}{2}$ -inch round iron, with shoulder, resting on additional center and back bars and extending to upper panel on each side of body, flattened and secured to panel with two bolts through bows or studs; braces to pass through bars and be secured with nut on bottom. To have one $\frac{1}{2}$ -inch round iron brace 12 inches long, from each end of front middle rail (secured to it by bolt through corner plate), extending to foot-board and bolted to it.

CORNER-IRONS.—To have one $\frac{1}{2}$ -inch by $\frac{1}{2}$ -inch iron plate at each front corner on middle rail, extending 5 inches each way and secured by two screws on each side of plate.

TAIL-GATE.—Material: frame-work, white oak; panel, yellow poplar, $\frac{1}{2}$ inch thick. To be the width of body, with three studs and rail on top (size of middle rail), neatly and securely joined to body by two suitable hinges; arranged to fasten with spring catches and boxes, to prevent body from spreading; panel to be riveted to frame.

STEP, of 1-inch ash, at back of body, 3 feet long, $\frac{1}{2}$ inches wide, 16 inches below top of floor; rests to be bolted to back-bar; step strengthened by braces extending back to second bar. Rests and braces flattened and secured to step with two $\frac{1}{2}$ -inch bolts in each.

LAZY-BACK, $4\frac{1}{2}$ inches wide, 15 inches from rear of front bow, fastened to an additional stud which will be screwed to top and middle panels; to be trimmed in front and rear same as litters.

BOX, OR DRIVER'S SEAT.—In front of body, of $\frac{1}{2}$ -inch pine, $13\frac{1}{2}$ inches wide, with hinged and cleated lid and hinged hasp and staple in front, with two partitions so arranged as to leave 19 inches space in the clear at each end; these spaces to have neat rests for water-kegs, each of which will be steadied by means of straps attached to rests, and so arranged as to buckle on top of kegs and at each end.

KEGS.—Two in number, of best quality oak; length, 16 inches; diameter, 9 inches in center, tapering to 7 inches at each end, with eight (8) hoops $\frac{1}{2}$ inch wide; to have $\frac{1}{2}$ -inch brass globe cocks, with T handles and tinned shanks to screw in. An aperture will be cut in front lower panel on each side, to allow keg to project 1 inch. Rests to be so arranged as to prevent keg from breaking panel.

WEAR-IRONS.—To be 6 inches long, securely bolted to sills.

LITTERS, of $\frac{1}{2}$ -inch poplar boards, divided into four (4) parts. The two boards next to panel to be 13 inches wide, the middle litter boards 10 inches wide each, joined to panel boards by three (3) 6-inch light-strap hinges; litter to rest on upright studs (four (4) on each side) of $1\frac{1}{2}$ inches ash, $11\frac{1}{2}$ inches high; cross-pieces of ash, same thickness, secured to middle rail; to have four (4) iron uprights, $\frac{1}{2}$ inch diameter, to support middle boards, with eyes, fastened to cleats on middle boards; floor to have socket-plates for uprights to rest in; panel boards of litters to be jointed 18 inches from front ends, with two (2) 6-inch light strap-hinges each, arranged to raise as pillows when needed by means of rods with eyes. Each board of litters to have two cleats fastened with screws to prevent warping. One panel board to be fastened to frame of body with three $2\frac{1}{2}$ -inch butts; the other bolted to cross-pieces.

TRIMMING.—Top, curtains, and hood of 12-ounce cotton duck, $28\frac{1}{2}$ inches wide, Army standard: three (3) curtains on each side, to lap 3 inches on upper panel and be secured by seven (7) wire staples and pins in upper panel on each side and one in center of curtain on each bow. Back curtain to be secured to rear edge of bows with (2) staples and pins on each side and three (3) in tail-gate. Front curtain to be fastened

to front rib with four (4) curtain knobs, and arranged to fall directly in front of lazy-back, and to button to back of box with three (3) curtain knobs. All curtains to have circular leather stay pieces, 2 inches diameter, through which each staple and knob must pass, well sewed with well-waxed harness thread. Staple pins will be attached to $\frac{1}{2}$ -inch leather straps, 6 inches long, well sewed to curtains. All curtains, except front, to have roll-up straps and buckles, and a $\frac{1}{2}$ -inch molding will be nailed to curtain-rail on each side to cover heads of tacks. Mattresses of litters and sides of body to be stuffed $2\frac{1}{2}$ inches thick with curled horse-hair and covered with best quality twilled enameled cloth. Cushion for front box of same material and thickness as mattress for litters. Edges of panel and middle boards of litters to be trimmed for finish.

RUNNING-GEAR.

MATERIAL.—Axles: Best quality refined American iron; hubs, locust or white elm, thoroughly seasoned. All other wood-work about running-gear to be best quality hickory, free from defects and thoroughly seasoned.

AXLES.— $1\frac{1}{2}$ inches left square 7 inches from each collar-washer; balance round; collar-washer, $2\frac{1}{2}$ inches diameter, $\frac{1}{2}$ inch thick; wheel-boxes of best quality foundry iron, $7\frac{1}{2}$ inches long, $1\frac{1}{2}$ inches diameter, $\frac{7}{16}$ inch thick at butt, $1\frac{5}{8}$ inches diameter, $\frac{5}{16}$ inch thick at point, with two lugs 2 inches long, $\frac{1}{2}$ inch high; oil-chamber 2 inches long, $\frac{1}{2}$ inch deep, to commence $2\frac{3}{4}$ inches from butt; weight of box to be not less than $4\frac{1}{2}$ pounds each. Axles to be arranged to track 5 feet from center to center of wheels. Front axle to have 1 inch curve upward at center.

WHEELS.—Height without tire: Hind, 4 feet 2 inches; front, 3 feet 6 inches; hubs, 9 inches long; $6\frac{1}{2}$ inches diameter at center, $5\frac{1}{2}$ inches at butt, $4\frac{1}{2}$ inches at point; mortised for 16 hind and 14 front spokes; size of mortise $1\frac{1}{2}$ inches by $\frac{9}{16}$ inch, with $\frac{1}{2}$ inch stagger.

BANDS.—Spoke-bands of $\frac{1}{2}$ -inch round iron; point-band $1\frac{1}{2}$ inches by $\frac{1}{2}$ inch; butt-band, 1 inch by $\frac{1}{4}$ inch, no projection, secured by three (3) nails passing through each.

SPOKES.—Hub-tenon, $1\frac{1}{2}$ by $\frac{5}{8}$ inch; felloe-tenon, $\frac{3}{4}$ inch in diameter.

FELLOES.—Two (2) pieces for each wheel, $1\frac{1}{2}$ inches deep, $1\frac{1}{2}$ inches tread.

TIRE. of best quality tire iron, $1\frac{1}{2}$ by $\frac{5}{8}$ inch; two (2) plates on each wheel over joint of felloes, eight bolts to fasten each tire on wheels. Wheels to have $\frac{1}{2}$ inch dish.

SPRINGS.—Platform, of No. 3 steel, "English oil-tempered," $1\frac{1}{2}$ inches wide, seven (7) leaves, with 6-inch sweep.

Hind side-spring to be so arranged as to rest directly on additional center-bar, with 1-inch oval stay, 2 feet 8 inches long, passing under center-bar, with brake attached and securely bolted to sills; to have side brace of $\frac{1}{2}$ -inch round charcoal-iron, 12 inches long, passing through spring and hanger (acting as brace and bolt) and securely bolted under body to additional center-bar.

Hind cross-springs to rest under back-bar, with block of proper depth, springs and block to be clipped neatly and securely to back bar.

Front side-springs to be fastened to eye in iron under splinter-bar, with $\frac{1}{2}$ -inch diameter bolt.

Front cross-spring to be clipped to block 18 inches long, the width of spring and of proper depth, the block to be clipped to hounds.

Springs to be attached to front and hind axle with clips of $\frac{1}{2}$ -inch oval iron, with blocks of proper depth, both ends of each clip to pass through a $\frac{3}{8}$ -inch iron plate, 1 inch wide, to serve as washer. All other clips to be $\frac{1}{2}$ -inch charcoal round iron, flattened on top to $1\frac{1}{2}$ inches, secured in same manner as axle clips. Hanger irons or couplings for springs to be of $\frac{3}{8}$ -inch by 1-inch charcoal iron, forged solid, with $\frac{1}{2}$ -inch bolt.

HOUNDS.—Length to suit springs; jaws, 18 inches long; thickness from jaws to front of hound-bed $1\frac{1}{2}$ inches; thence thickness reduced to $1\frac{1}{4}$ inches, with $\frac{3}{8}$ -inch round iron rod extending the full length, passing under and bolted to hound-bed, with ends flattened and bolted to hound; to have an iron plate on inside of jaws $\frac{1}{2}$ inch thick the width of hound and 18 inches long, secured to jaws by $\frac{1}{2}$ -inch rivet in each end.

HOUND-BED. 26 inches long, $3\frac{1}{2}$ deep, $2\frac{1}{2}$ inches wide, with iron plate $\frac{1}{2}$ inch thick on under side, full length and width of bed.

Transom plate 17 inches long, $2\frac{1}{2}$ inches wide, $\frac{3}{8}$ inch thick, secured by two $\frac{1}{2}$ -inch diameter bolts, countersunk heads (passing through bed and plate), with hole to receive $\frac{3}{8}$ -inch king-bolt in center. Plate to be grooved to receive upper transom-plate, thus preventing accident from breaking of king-bolt.

SIDE BARS. $1\frac{1}{2}$ inches square, mortised into hound-bed and splinter-bar; to have iron plates $\frac{3}{8}$ inch thick full length and width of bars, securely bolted to them, and welded to plates under splinter-bar and hound-bed.

SPLINTER-BAR.—Length to suit spring, $1\frac{1}{2}$ inches deep, $1\frac{1}{2}$ inches wide, to rest on top of hounds, with 1-inch oval iron full length of bar, passing under hounds (with bolt through splinter-bar and hound), this iron to have two lugs on outside of hounds to hold them in place and to drop $1\frac{1}{2}$ inches below them, arranged for a half-elliptic spring, to which single-tree will be attached.

To have, on top of splinter-bar, an iron plate, 1 inch wide, $\frac{1}{2}$ inch thick, extending 15 inches from end and 8 inches on side-bar, securely bolted to each; splinter-bar to have a 3-inch diameter step on each end.

HALF-ELLIPTIC SPRINGS.—To be 2 inches wide, No. 3 steel, "English oil-tempered," four leaves and of proper length, secured to splinter-bar iron under hounds with two $\frac{1}{2}$ -inch diameter bolts; to have rods of $\frac{1}{2}$ inch best quality round iron from each end of spring, passing through hanger on splinter-bar iron, and attached with eye to single-tree staple.

CHAIRS.—Consisting of three (3) bars, framed together, securely bolted to bed; center-bar 2 inches thick, outside ones $1\frac{1}{2}$ inches thick, of proper depth and length; upper half of transom plate on center-bar, $\frac{1}{2}$ inch thick and of width and length to fit neatly into lower half of plate on hound-bed. Plate secured with two $\frac{1}{2}$ -inch bolts, countersunk heads, passing through plate and bar.

FIFTH WHEEL, 19 inches diameter from out to out, $1\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, with lip on outer edge of lower half to receive upper half of wheel; lower half secured to hounds and hound-bed by six (6) bolts, countersunk heads; upper half fastened securely to chair, with countersunk-head bolts.

BRAKE.—Double action, side rods, $\frac{1}{2}$ -inch round iron, front cross-rods, $\frac{1}{2}$ -inch round iron; lock plate rod, $\frac{1}{2}$ -inch by $1\frac{1}{2}$ -inch iron; rub blocks of hard wood, 8 inches long; lever arranged with jaws for foot use.

SINGLE-TREES, 2 feet 10 inches long; diameter in center 2 inches, at ends $1\frac{1}{2}$ inches, with $\frac{1}{2}$ -inch iron staple in center passing through and riveted to tree; tree to be attached to rod from half-elliptic spring with loose eye; ferrules, $1\frac{1}{4}$ inches long; cock-eyes to be of wrought iron, 3 inches long, $\frac{1}{2}$ inch diameter, with thread and 5-16-inch trace ring, $1\frac{1}{4}$ -inch diameter in the clear, attached.

TONGUE, 11 feet long (9 feet 6 inches from front of hounds); $2\frac{1}{2}$ inches wide by 2 inches thick at jaws of hounds, tapering to 2 inches wide at butt, and $1\frac{1}{2}$ inches square at front end; caps of $\frac{1}{2}$ -inch round iron; plates on sides of $1\frac{1}{2}$ by $\frac{1}{2}$ inch iron and extending 9 inches down tongue, secured by two $\frac{1}{2}$ -inch bolts; to have two chains in cap, 2 feet 2 inches long, of $\frac{1}{2}$ -inch twisted links, with two $\frac{1}{2}$ -inch rings in each chain, $1\frac{1}{2}$ inches diameter in the clear, one at end, the other about 6 inches distant.

GOOSE-NECK.—Tongue to have goose-neck, for attachment of lead-bars, on top at front end, of $\frac{1}{2}$ -inch round iron, flattened to 1 inch by $\frac{1}{2}$ inch, secured to tongue with two (2) $\frac{1}{2}$ -inch bolts; neck to be not less than 6 inches long. Tongue to be fastened in jaws of hound with $\frac{1}{2}$ -inch tongue bolt, with nut on end. To have 12-inch monkey-wrench, and round tar-bucket of galvanized iron (capacity 6 pounds), with each ambulance.

PAINTING.

All wood and iron work to be finished with one priming coat, of lead color, followed when dry, by two good coats of best quality chrome yellow, in oil, shaded to color of hospital flag, with black letters—"U. S."— $3\frac{1}{2}$ inches long, in third lower panel from front on each side.

WORKMANSHIP.

Spokes and wheel boxes to be well wedged; tenons secured with wooden pins; all welds to be made smooth and strong; corners of felloes to be rounded between spokes; studs chamfered between rails; sharp corners of bows to be removed; curtains and trimmings for litters to be well fastened with "Shelton" tacks.

The ambulances are to be so constructed that the several parts of any one ambulance will agree and exactly fit those of any other, so as to require no numbering or arranging for putting together, and all the materials used for their construction to be of the best quality, and the work in all its parts faithfully executed in the best workmanlike manner.

INSPECTION.

The work shall be inspected from time to time, as it progresses, by an officer or agent of the Quartermaster's Department, and none of it shall be painted until it shall have been inspected and approved by said officer or agent authorized to inspect it.

Prepared at Jeffersonville Depot, under authority, dated January 25, 1875, from the Quartermaster-General's Office.

Ambulance known as the Finley pattern.

Articles of agreement, made and entered into this _____ day of _____, 18_____, by and between _____, quartermaster for United States Army, for and in behalf of the United States, and _____, witnesseth:

First. It is agreed that the said _____, heirs and assigns, shall well and truly make, or have made, built and delivered, as herein stated, _____ two-wheeled ambulances, of the size and description as follows, to wit:

BODY OF AMBULANCE.

Sills 6 feet $9\frac{1}{2}$ inches long, out to out, 1 inch thick and $2\frac{3}{4}$ inches wide.

Four posts, of 1 inch square; distance from first post to second, front, is 18 inches, and back, 18 inches from back post.

Top rail 2 inches in center, tapers to $1\frac{1}{2}$ inches at each end.

To be 6 feet $8\frac{1}{2}$ inches in the clear in length, and 4 feet $4\frac{1}{2}$ inches in width in the clear.

Posts, 3 feet 6 inches from top of sill to top of top rail.

The middle sill is $5\frac{1}{4}$ inches wide, by 1 inch thick.

Sides $15\frac{1}{2}$ inches high, top sides 6 inches high, secured by hinges to lower sides, the whole length of the body, or between the posts—each top side, when up, secured to posts by buttons $1\frac{1}{2}$ inches long.

Back door 23 inches high, front top side is $8\frac{1}{2}$ inches high, and attached by brass hinges to lower side; 7 cross-bars to form the top, covered by $\frac{1}{4}$ -inch boards, then with oil-cloth.

The front and back middle posts are $1\frac{1}{2}$ inches by $1\frac{1}{4}$ inches; a groove is cut in each of these posts on the inside, for a half-inch center-board.

There are two doors in rear (hung on carriage-hinges); the whole height of body secured by bolts on the outside, and also plated carriage-handles and small catches.

The center-board is 14 inches wide, and placed 6 inches above the middle sill.

One middle post, 1 inch by $1\frac{1}{2}$ inches.

Spring-bars, 6 inches by $1\frac{1}{2}$ inches, and placed $16\frac{1}{2}$ inches from front to center of bar, and 2 feet from back end to center of the spring-bar.

Oil-cloth curtains on each side, and at each end, and made in three parts on each side—2 in rear end, and one at front end, made to roll up and fasten with straps on inside; the frame of body white ash, and the sides or panels $\frac{1}{2}$ poplar.

SHAFTS OF AMBULANCE.

Shafts to be of hickory, 14 feet 4 inches long and 2 inches square, to be 3 feet 5 inches wide, out to out.

The back-bar is 2 inches square; to have the axle 2 feet 6 inches from outside of back-bar to center of axle, and from center of axle to inside of back-bar, in front, 2 feet 10 inches; the second bar from front to be $7\frac{1}{2}$ inches wide, an open space of $3\frac{1}{2}$ inches between this bar and the front-bar; front-bar is $2\frac{1}{4}$ inches by $1\frac{1}{2}$ inches wide, and next to front $7\frac{1}{2}$ inches by $1\frac{1}{2}$ inches.

Width of shafts 3 feet 5 inches out to out; same at front and hind bar.

Shafts curved at front end about 5 inches; shafts and wheels are painted red, varnished.

Axle 3 feet 11 inches long between the shoulders, cranked 5 inches from bottom to top.

Springs 37 inches long, $1\frac{1}{2}$ inches wide, 3 plates (4 elliptic springs).

Seat on shafts 13 inches by 22 inches and 15 inches high: the drawer under seat is 16 inches by 12 inches and 6 inches deep, placed on front-bars so as to clear the body about 4 inches; braces for seat to be of $\frac{1}{2}$ -inch round iron, and ends attached to bars by $\frac{1}{2}$ -inch bolts.

A tandem-rod goes along the side of shafts, secured by bolts; it is 2 feet 9 inches long, and has a ring in the front end.

3 feet 6 inches from front bar to quoiler staple there is a brace attached to front-bar and shafts in each corner; it serves as a place for driver's feet, and is made of circular shape, 18 inches long.

The hind springs set $9\frac{1}{2}$ inches from hind end of shafts to center of spring-block; the front springs set from center of axle $21\frac{1}{2}$ inches to center of front spring-block.

Axle is set 2 feet 6 inches from back end of bar or shafts to center of axle.

Arms of axle $1\frac{1}{2}$ inches by $1\frac{1}{2}$ inches, solid box $8\frac{1}{2}$ inches long.

Wheels secured on axles by linchpins and patent washers; the linchpin is $\frac{1}{2}$ inch by $\frac{1}{4}$ inch.

Wheels 4 feet 7 inches high, hubs 7 inches by 9 inches, spokes $1\frac{1}{2}$ inches by $1\frac{1}{4}$ inches, felloes $1\frac{1}{2}$ inches by $1\frac{1}{2}$ inches, tire $1\frac{1}{2}$ inches by $\frac{1}{2}$ inch, and secured by tire-bolts.

Four bands on each hub.

LITTER OF AMBULANCE.

Sills 3 inches by $1\frac{1}{2}$ inches; whole length 6 feet 6 inches and 22 inches wide, hole in center of board 9 inches in diameter.

Hooks $5\frac{1}{2}$ inches long, fastened in the sills by staples, to keep the legs stationary.

Handles 2 feet 8 inches long, $1\frac{1}{2}$ inches by $\frac{1}{2}$ inch; a small plate of iron on the handle 16 $\frac{1}{2}$ inches from front end, to keep the handles from pulling out of the staples.

Trap-door in bottom of the top board of litter, to which is made fast, by screws, the center piece to close the hole—it is fastened to the board by strap hinges, and must have a bolt (spring bolt) with chain attached so to let down easily.

White pine board on top of frame to support mattress, 22 inches wide by $\frac{3}{4}$ thick, with battens to stiffen it, and 4 pieces at ends, to change position of opening in long board either way from the ends of the litter.

Legs 18 $\frac{1}{2}$ inches long: 2 bars to be fastened on with carriage-door hinges; the bars are 1 $\frac{1}{2}$ inches by $\frac{3}{4}$ inch, bottom bars 3 inches from end of leg—top bar 15 inches from top of bottom bar—legs at tenon 1 $\frac{1}{2}$ inches wide at top, and 1 $\frac{1}{2}$ inches at bottom.

A thumb-screw, 8 inches from bottom of legs, used to fasten the legs to sill of litter when they are put up, leather loops on handles to pull them out by.

Frame made of ash and oiled; handles of hickory.

Springs 1 $\frac{1}{4}$ inches wide, 2 plates, with roller, about 1 $\frac{1}{2}$ inches diameter in center to curve, 3 inches from under side of frame.

THE INCLINED PLANES.

On litter is placed, at one end, 1 inclined plane, or frame, 2 feet long and 21 inches wide, with 7 slats, 2 inches wide, screwed on the frame, and duplicate side pieces on bottom of same with hinges at one end to elevate, as may be required, to raise the head of the patient when lying on the litter, and the same supported by two braces, 1 inch square and 10 inches long.

At the other end of litter is a double inclined plane, with hinges 2 inches from center, to raise and lower, and braces also attached, and so arranged that the lower extremities of the patient can be raised at the knee, or foot, as the state of the patient may require. This frame-work is of light wood, $\frac{1}{2}$ -inch slats, and $\frac{1}{2}$ inch thick side pieces, and all arranged to lay flat on the litter-board.

THE MATTRESS FOR AMBULANCE.

In 6 sections, 6 feet 6 inches long, and 21 inches wide; the sections are secured by straps on side of mattress.

A gutta-percha cloth 30 inches wide goes around the center of the mattress, to keep from soiling the ticking when in use; the hole in mattress is same size as that in the board or litter, say 9 inches in diameter; a plug of same material as mattress goes in the hole, to make it solid (this is also covered with gutta percha), with strap of webbing to remove it at pleasure.

Mattress is stuffed with best curled hair, and covered with ticking.

Each side of the body of the ambulance to be marked U. S.; all other parts to be lettered U. S.

It is agreed and distinctly understood, that the ambulances are to be so constructed that the several parts of any one ambulance will agree and exactly fit those of any other, so as to require no numbering or arranging for putting together, and all the materials used for their construction to be of the best quality: all the wood thoroughly seasoned, and the work in all its parts faithfully executed in the best workmanlike manner.

The work may be inspected, from time to time, as it progresses, by an officer or agent of the Quartermaster's Department, and none of it shall be painted until it shall have been inspected and approved by said officer or agent authorized to inspect it. When finished, painted, and accepted by an officer or agent of the Quartermaster's Department, and delivered as herein agreed, they shall be paid for.

The ambulances are to be delivered at _____ at such place as the quartermaster or his agent may designate, and the contractor to assist in taking them apart for shipping. It is agreed that _____ of the ambulances complete, shall be ready for delivery on or before the _____ day of _____, 18_____, _____ on or before the _____ day of _____, and the remainder on the _____ day of _____, 18_____.

In case of failure on the part of the contractors to make and deliver the work at the time aforesaid, and in the manner specified in this agreement, the quartermaster shall make good the deficiency by purchasing in open market, at the expense of said contractors.

It is agreed that the aforesaid _____, quartermaster, U. S. A., for and in behalf of the United States, shall pay or cause to be paid to said contractors or _____ assigns the sum of _____ dollars, for each ambulance, complete in all its parts as herein described, made and delivered agreeably to this contract.

It is expressly understood that no member of Congress shall be admitted to any share or part in this contract or any benefit to arise therefrom directly or indirectly.

In witness whereof, we have hereunto set our hands, at _____, this _____ day of _____, 18_____.

Ambulance known as the Coolidge pattern.

Articles of agreement, made and entered into this — day of —, 18—, by and between —, quartermaster for United States Army, for and in behalf of the United States, and —, witnesseth:

First. It is agreed that the said —, — heirs and assigns, shall well and truly make, or have made, built, and delivered, as herein stated, — two-wheeled ambulances, of the size and description as follows, to wit:

BODY OF AMBULANCE.

Sills whole length 7 feet 6 inches out to out; $2\frac{1}{2}$ inches by $1\frac{1}{4}$ inches; body is 6 feet 9 inches long out to out, and 4 feet $1\frac{1}{2}$ inches wide out to out.

Side panels 18 inches high by $\frac{1}{2}$ inch thick; 4 posts 1 $\frac{1}{2}$ inches by 1 inch; top rail on the sides extends over the panel, on inside $\frac{1}{2}$ inch, and is $1\frac{1}{2}$ inches by 1 inch, flush with panel.

Sills inside between posts, 2 inches by 1 inch, put in edgewise to strengthen sides; body has front and back piece and two bars; solid floor.

Tail-board to let down, and is same height as side panels, connected to body by a rod and 4 hinges.

Two posts in the center (for partition board) which extends from sill to roof; partition board is $16\frac{1}{2}$ inches high and goes the whole length of the body and under the seat; the front post is back of the seat.

Height of top 4 feet $4\frac{1}{2}$ inches at sides, with $7\frac{1}{2}$ -inch bow in middle.

There is an iron roller at end of body inside and reaches all the way across it; this is for rolling the litter frame in; it has shoulders let into the posts.

Foot-board extends out $8\frac{1}{2}$ inches, and turns up 4 inches. Seats 21 inches wide, with bar behind top of seat; cushions 13 inches. Seats raise in the center on both sides of post, and when up are fastened to post by leather straps. The seats are fastened to a piece in center (that reaches from post to front) by strap-hinges, 2 on each seat. The front top-piece is made rounding to suit the driver's knees. The back of seat is composed of a leather strap $3\frac{1}{4}$ inches wide, secured to the three posts; an oil-cloth curtain drops down inside so as to come right directly back of seat.

The head-lining to be of oil-cloth. The roof is composed of cross-pieces at each post, and $\frac{1}{2}$ -inch boards covered with oil-cloth. One curtain of heavy oil-cloth on each side (with one glass in center of each) fastened with eyes and pins.

The bonnet on front extends 1 foot from front.

There are two hooks inside, made of 1-inch by $\frac{1}{2}$ -inch iron, $4\frac{1}{2}$ inches long, and fastened to middle posts, used for hanging rifle or musket on; they are 2 inches in the clear of bend.

Baggage-crate, $2\frac{1}{2}$ feet from bottom, rests on two rails, $2\frac{1}{2}$ inches deep by $\frac{1}{2}$ inch thick. The crate is made of four slats on bottom, and turns up on each side secured by two ribs, which are secured to two middle posts. The slats and ribs are 1 inch square. The sides or parts turned up drop down by two small strap-hinges inside.

The frame of body is made of white ash, and the sides or panels of $\frac{1}{2}$ -inch poplar.

A strap 5 feet long, $1\frac{1}{2}$ inches wide, goes from the side around the tail-board, and passes through iron loops to hold the tail-board up, and buckles on side.

A keg, for water, 14 by 10 inches, with handle on it, is hung to a hook on tail-piece of sills, the hook well secured by two screw-bolts; the bung to be fastened by leather strap to handle.

SHAFTS OF AMBULANCE.

Shafts 11 feet 3 inches long out to out, 2 inches by $1\frac{1}{4}$ inches; two bars $1\frac{1}{2}$ inches square, drawn together in middle by two screw-bolts 4 feet $2\frac{1}{2}$ inches long, on shafts they spread 9 inches in the clear at ends. The singletree is fastened on bottom of the two bars by clevis and bolt, 3 feet $3\frac{1}{2}$ inches long. The step is also fastened on these bars; a plate or brace in elbow-shape is fastened to bottom of bars and shaft. The bolts that fasten the step also takes this plate through each bar. A tandem-rod goes on side of each shaft, 2 feet $9\frac{1}{2}$ inches long, secured at back end by two small bolts through the shafts; a ring (small) goes in the front end of rod.

There is a prop-stick on each shaft (on bottom), 2 feet $6\frac{1}{2}$ inches long, $1\frac{1}{4}$ inches round, and is connected to the shaft by shackle welded on the front-bar brace, a ferrule on both ends of the prop-stick; the bottom end has a piece of iron driven in it and left extend about 1 inch from end of stick, to be fastened when up by catch or hook on shafts. Back end of shafts extend $3\frac{1}{2}$ inches from axle; there is an iron plate extending from one end of shaft to the other, $1\frac{1}{2}$ inches by $\frac{1}{2}$ inch; the shackle for front-spring is welded onto this plate; the side-springs are fastened to the front-springs by a solid shackle, connected by four clips or ties to shackle on shafts, $3\frac{1}{2}$ inches long, 1 inch by $\frac{1}{2}$ -inch iron.

Springs, all half-springs, the front-spring is 3 feet 8 inches long, 2 inches wide, 7 plates; the back-spring is 3 feet 8 inches long, 2 inches wide, 6 plates; side-springs 4 feet 5 inches long, 2 inches wide, 6 plates; the side-spring shackles work through eyes welded in back-spring shackles inside, the bolts of these shackles must not be screwed tight enough to prevent motion; the springs at sides are fastened to axles by clips 2 inches by $\frac{1}{2}$ -inch and two $\frac{3}{8}$ -inch bolts.

Axles arms are 1 $\frac{1}{2}$ inches by 1 $\frac{1}{2}$ inches; boxes 8 $\frac{1}{2}$ inches long. The axle is cranked 6 inches from top to top.

Shafts, at back end, are 4 feet 4 $\frac{1}{2}$ inches wide, out to out.

The axle sets between the shafts and the hubs, and is fastened by clips through shafts and over top of axle; clips 1 $\frac{1}{2}$ -inches by $\frac{3}{16}$ -inch iron.

The spring-block back is 12 $\frac{1}{2}$ inches long, 2 $\frac{1}{2}$ inches deep.

The spring-bars are made of 1-inch round iron, flattened in the middle to $\frac{5}{8}$ inch; two $\frac{1}{4}$ -inch bolts go through the bar, round, and spring, in the center. Bars are 4 feet 1 inch long, and curved 7 inches, with a T on each end 6 inches long by $\frac{1}{2}$ inch thick, the sills of body set on these T's, and is fastened by a bolt in each end of T.

The axle is 4 feet $\frac{1}{2}$ inch on bottom, and 4 feet 5 inches between the collars.

The shafts are of white hickory.

DESCRIPTION OF LITTER.

Litter-frame sill outside is 6 feet 4 $\frac{1}{2}$ inches, and 22 inches wide, 2 $\frac{1}{2}$ inches by 1 inch; the side panels are 6 inches wide by $\frac{1}{2}$ inch thick.

The legs, which form the handles also, 2 feet long, 1 $\frac{1}{2}$ inches by 1 $\frac{1}{4}$ inches, secured to the inside of the sill by bolt, so as to turn up even with the sill; slots cut in front end of frame to allow the legs to turn up to form the handles. There is a set or thumb screw in each leg to fasten them to the sills when not in service as a litter.

There are four small trunk-rollers set in each corner of frame to roll it in without difficulty.

DESCRIPTION OF THE INCLINED PLANES.

On litter-sills is placed, at one end, one inclined plane or frame 2 feet 6 inches long, 22 inches wide, with seven slats to support the mattress; these slats are 2 inches wide and screwed on the frame, and duplicate side-pieces on the bottom of the same, with hinges at each end to elevate the patient as may be required (at head) when laying on the litter, the same supported by the duplicate side-pieces; the upright or side pieces are kept in position by one rack on each side, made of cast iron, with teeth; this rack is 13 inches long, teeth are 1 $\frac{1}{2}$ long, left into the sill even with the top, and are clipped around the ends with iron to hold in the rack-teeth.

At the other end of the litter is a double inclined plane, with hinges 2 inches from center toward the front, to raise and lower, and duplicate side-pieces about 5 inches from front end, to have a cast-iron rack same as in front: this inclined plane is made so that the lower extremities of the patient can be raised at the knee or foot as the state of the case may require.

Both these inclined planes are fastened in the center of sill to center-piece (5 inches wide) by strap-hinges: this frame-work is of light wood, slats are $\frac{1}{2}$ inch thick, and all arranged to lay level or flat on the sills of litter-frame.

MATTRESS.

In 3 sections, to be made of ordinary thickness, the foot section is 19 $\frac{1}{2}$ inches long to joint, second same length, third or head 2 feet 9 inches long; these are jointed on the top by binding, and are calculated to fit on the inclined planes: a small bolster is fastened on the head section, and there is a small pillow for each mattress in addition to the bolsters; the mattress is made of best ticking, and stuffed with best curled hair; the pillows are stuffed with hair.

WHEELS OF AMBULANCE.

4 feet 7 inches high; hubs, 7 inches by 9 inches; spokes, 1 $\frac{1}{2}$ inches by 1 $\frac{1}{2}$ inches; felloes, 1 $\frac{1}{2}$ inches by 1 $\frac{1}{2}$ inches; tires, 1 $\frac{1}{2}$ inches by $\frac{1}{2}$ inch, and secured by bolts; 4 bands on each hub; the wheels are secured on axles by washer (patent) and linchpin instead of nuts; linchpin $\frac{1}{2}$ inch wide by $\frac{3}{16}$ inch thick.

Each side of the body of the ambulance to be marked U. S.; all other parts to be lettered U. S.

It is agreed and distinctly understood that the ambulances are to be so constructed that the several parts of any one ambulance will agree and exactly fit those of any

other, so as to require no numbering or arranging for putting together, and all the materials used for their construction to be of the best quality; all the wood thoroughly seasoned, and the work in all its parts faithfully executed in the best workmanlike manner.

The work may be inspected, from time to time, as it progresses, by an officer or agent of the Quartermaster's Department, and none of it shall be painted until it shall have been inspected and approved by said officer or agent authorized to inspect it. When finished, painted, and accepted by an officer or agent of the Quartermaster's Department, and delivered as herein agreed, they shall be paid for.

The ambulances are to be delivered at _____, at such place as the quartermaster or his agent may designate, and the contractor to assist in taking them apart for shipping. It is agreed that _____ of the ambulances complete shall be ready for delivery on or before the _____ day of _____ 18____; _____ on or before the _____ day of _____ and the remainder on the _____ day of _____ 18____.

In case of failure on the part of the contractors to make and deliver the work at the time aforesaid, and in the manner specified in this agreement, the quartermaster shall make good the deficiency by purchasing in open market, at the expense of said contractors.

It is agreed that the aforesaid _____, quartermaster, U. S. A., for and in behalf of the United States, shall pay or cause to be paid to said contractors or _____ assigns the sum of _____ dollars, for each ambulance, complete in all its parts as herein described, made and delivered agreeably to this contract.

It is expressly understood that no member of Congress shall be admitted to any share or part in this contract or any benefit to arise therefrom directly or indirectly.

In witness whereof we have hereunto set our hands, at _____, this _____ day of _____ 18____.

Ambulance known as the Wheeling pattern.

Articles of agreement, made and entered into this _____ day of _____, 18____, by and between _____, quartermaster, for United States Army, for and in behalf of the United States, and _____, witnesseth:

First, it is agreed that the said _____, _____ heirs and assigns, shall well and truly make, or have made, built and delivered, as herein stated, four-wheeled ambulances of the size and description as follows, to wit:

AMBULANCE BODY.

Sills 8 feet 6 inches long, out to out (including foot-board), $2\frac{1}{2}$ inches wide by 2 inches deep. Foot-board 12 inches wide, 1-inch ash stuff, and fastened by 3 bolts to sills: 6 cross-bars in frame of body, front bar $2\frac{1}{2}$ inches wide by 2 inches deep, middle bars $2\frac{1}{2}$ inches wide by 2 inches deep, back bar $2\frac{1}{2}$ inches deep by 2 inches wide with iron brace to stud (the center bar of body to be the same as back bar with iron stay to stud), body 4 feet wide from out to out, bottom of body $\frac{1}{2}$ -inch pine boards, planed; 7 studs on side of body. The 4 bows mortised in sills of body make part of the 7 studs; the studs 13 inches high, $1\frac{1}{2}$ inches wide, $\frac{3}{8}$ thick, middle rail $1\frac{1}{2}$ inches wide, 1 inch deep. The lower panel poplar, $10\frac{1}{2}$ inches wide by $\frac{3}{8}$, the second or middle panel poplar, $6\frac{1}{2}$ inches wide by $\frac{3}{8}$; the top panel ash, 4 inches wide by $\frac{3}{8}$. Depth of body from out to out $23\frac{1}{2}$ inches; 4 bows $1\frac{1}{2}$ inches wide by $\frac{3}{8}$; top 4 feet 6 inches high from inside of bottom to top of ridge-pole, from top of upper panel to curtain-rail 2 feet 3 inches; extra ribs on top the length of body, 7 feet 6 inches out to out, bonnet on front bow 12 inches wide; door in back of body 21 inches wide, $17\frac{1}{2}$ inches deep, with 2 strap-hinges on stud, with door-lock and silver-plated handle; 2 heavy iron corner plates to be fastened by 10 screws, No. 10, on door, studs, and back bar; a round hole cut in the back panels $\frac{7}{8}$ inches in the clear, for water-kegs, a box in front of body $11\frac{1}{2}$ inches deep, $12\frac{1}{2}$ wide, with lid and hinges; lazy-back covered with oil-cloth and stuffed with curled hair, fastened to side rails. The frame-work of the body the best quality white oak, and thoroughly seasoned; the bows ash; cover of ambulance, front and back curtain, 12-ounce cotton duck, $28\frac{1}{2}$ inches wide, Army standard; 3 curtains on side of body with leather straps sewed on with harness-thread, waxed; the pin straps to be riveted on the curtain, roll-up strap and buckles; wooden molding nailed over the heads of tacks in tops; the front and back curtains to fasten on lower rail, in front curtain to knob on top of front and second bow. The body to be bolted on hind spring-bar with 4 bolts, and 2 bolts in front spring-bar; 4 corner plates on rail of body, wear-plates on sill of body, fastened with bolts; back-board 8 inches wide, 3 feet long, 1-inch ash stuff; 4 heavy stay-irons from back of body to back-board 2 feet long, 3 heavy stay-irons on front foot-board.

Water-keg 18 inches long, $9\frac{1}{2}$ inches in center, tapered to $8\frac{1}{2}$ at each end.

AMBULANCE LITTERS.

1 LITTER divided into 4 parts, 6 feet 3 inches long, 2 boards of litter next to panel 12 inches wide by $\frac{1}{2}$; the middle litter-boards 9 inches wide by $\frac{1}{2}$, poplar boards, with 12 strap-hinges, 6 upright studs 10 inches high, $1\frac{1}{4}$ inches square, with cross-piece made of ash.

3 IRON UPRIGHTS with eyes fastened to cleats on middle boards, to be fastened with leather straps to boards.

The sides of body to be trimmed with the best quality of duck oil-cloth, stuffed with curled horse-hair; the mattress of litters of the same oil-cloth and curled horse-hair; one oil-cloth covered cushion for front seat, stuffed with curled hair.

AMBULANCE SPRINGS, ELLIPTIC.

FRONT SPRING 3 feet 3 inches long, 2 inches wide, 6 plates, fastened with 2 bolts through head or spring-block, and 2 bolts through spring-bar; one cross-spring on back axle-bed, 3 feet 3 inches long, $1\frac{1}{2}$ wide, 4 plates, fastened on by 2 bolts through axle and axle-bed.

2 back side-springs, 3 feet 3 inches long, $1\frac{1}{2}$ wide 4 plates, fastened with 2 clips and 2 couplings each, with flat plate-iron on top of spring-plate to prevent the coupling from closing, and 2 bolts each through spring-bar; the best quality of spring steel.

HUBS gum, spokes and felloes white oak or hickory, thoroughly seasoned.

HIND WHEELS 4 feet 1 inch high without tire; hubs 8 inches long by $6\frac{1}{2}$ inches in the center, back of hubs $5\frac{1}{2}$ inches, front $4\frac{1}{2}$ inches; the spokes at shoulder $1\frac{1}{4}$ by 1 inch; felloes $1\frac{1}{2}$ deep by $1\frac{1}{2}$ inches; 16 spokes in wheel, felloes in 2 pieces.

FRONT WHEELS 3 feet 5 inches high without tire; hub, felloes, and spokes same as hind wheels; 14 spokes in wheels.

TIRE on wheels best refined iron, $\frac{1}{2}$ full by $1\frac{1}{2}$ inches, 2 plates on each wheel over the joint of felloe; 8 bolts to fasten each tire on wheel.

AXLES of iron $1\frac{1}{2}$ inches, with nut on each end; axle-box $7\frac{1}{2}$ inches long; the track of wheels 5 feet from center to center of wheels.

RUNNING-GEAR OF AMBULANCE.

To be made of the best quality of seasoned white oak or hickory.

FRONT AXLE-BED 4 feet 6 inches long, $3\frac{1}{4}$ inches deep in center, taper down at ends $1\frac{1}{2}$ inches; 2 inches thick in center, taper down $1\frac{1}{2}$ inches.

BACK AXLE-BED 4 feet 6 inches long, $2\frac{1}{2}$ inches deep in center, taper down on end $1\frac{1}{2}$ inches, $1\frac{1}{2}$ wide in center.

3 COUPLING-POLES 5 feet $7\frac{1}{2}$ inches long from center of axle-bed to center of spring-block, 2 inches deep, $1\frac{1}{2}$ wide; to be mortised in axle-bed and spring-block.

FRONT HOUNDS the whole length from end to end 3 feet 7 inches, 2 deep by $2\frac{1}{4}$ inches wide at axle-bed; the jaws of hounds 19 inches long for tongue; length of hounds from center of axle to back slider, $15\frac{1}{2}$ inches; length of slider, 2 feet.

TONGUE 10 feet 11 inches long by 3 inches at front of jaws, tapered down to 2 inches at back end, and tapered down at front end $1\frac{1}{2}$ inches; round ironed the same as omnibus, to be fastened by 3 bolts through jaws of hounds, on end of tongue, 2 breast-chains, $\frac{1}{2}$ -inch iron, 2 feet long, with 2 rings in each chain.

DOUBLETREE 4 feet long, $3\frac{1}{2}$ inches wide, $1\frac{1}{2}$ inches deep at center, tapered down at end $2\frac{1}{2}$ by $1\frac{1}{2}$.

SWINGLETREE 2 feet 10 inches long, ironed same as omnibus.

FRONT SPRING-BAR 2 inches square, tapered down $1\frac{1}{2}$ on end, fastened by 2 bolts through spring.

BACK SPRING-BAR 6 inches wide, $1\frac{1}{2}$ deep.

BREAK OF LOCK-BAR 5 feet 8 inches long, $3\frac{1}{2}$ inches wide in center, $1\frac{1}{2}$ inches deep, tapered down to $2\frac{1}{2}$ inches on each end; 2 clamps on end of bar for rub blocks, 4 inches wide by $1\frac{1}{2}$ and $\frac{1}{2}$ thick.

HEAD OF SPRING-BLOCK 2 feet $4\frac{1}{2}$ inches long, $2\frac{1}{2}$ inches deep in center, 2 inches wide.

PAINTING OF AMBULANCE.

2 coats of lead-color and 3 coats of brown-color paint on body and running-gear, striped with green paint; 1 coat of varnish on body and running-gear.

1 TAR-BUCKET, and AXLE-WRENCH.

IRON-WORK ON RUNNING-GEAR OF AMBULANCES.

IRON TRANSIT-PLATE on top of front axle-bed, 18 inches long by 2 inches wide, $\frac{1}{2}$ inch deep; iron plate on spring-block 18 inches long, 2 inches wide, $\frac{1}{2}$ inch deep; th

plate on axle-bed and spring-block fastened with 2 countersunk bolts each. Iron plate on the bottom of each coupling-pole welded to plate on spring-block, and extending to back axle to be fastened by axle-bolts, and 6 bolts through coupling-pole; size of iron plate $1\frac{1}{2}$ wide by $\frac{1}{2}$ inch.

STAY 1 inch oval iron, to extend from front of hound to back end, under axle, to be fastened with 3 bolts in front part of hounds, and 1 axle-bolt and bolt through the slider.

STAY 1 inch oval iron, from axle to hound, fastened by 3 bolts to each side of hounds.

STAY-CHAINS 2 feet long, fastened from hook or end of doubletree to hook on axle; stay 1 inch oval iron from side of coupling-pole to hind axle, fastened by 2 bolts through coupling-pole and bolt in axle; one hasp from doubletree to pole fastened with 2 bolts.

GUARD on front axle-bed, with safety hook attached to coupling-pole; 2 bolts in axle-bed.

LOCK-IRON, 2 rods, $\frac{1}{2}$ round iron, 3 feet 1 inch long, extending from cross-bar to front of lock-iron, fastened by 2 bolts in cross-bar and 2 bolts in lock-iron; the end of lock-iron flattened.

2 STAPLES for break-bar, $\frac{1}{2}$ oval iron, $8\frac{1}{2}$ inches long, 2 inches deep, fastened by 2 bolts to coupling-poles; 2 sliding plates in top of break-bar.

On the top of each end of side coupling-poles iron stay 12 inches long, extending to the outside of axle-bed, and outside of spring head-block to be fastened with 4 bolts in each pole, and axle and head-block bolts.

2 IRON PLATES 12 inches long, on the sides of center coupling-pole, to be fastened by 2 bolts through head-block, and 2 bolts through the coupling-pole.

Each side of the body of the ambulance to be marked U. S.; all other parts to be lettered U. S.

It is agreed and distinctly understood that the ambulances are to be so constructed that the several parts of any one ambulance will agree and exactly fit those of any other, so as to require no numbering or arranging for putting together, and all the materials used for their construction to be of the best quality; all the wood thoroughly seasoned, and the work in all its parts faithfully executed in the best workmanlike manner.

The work shall be inspected from time to time, as it progresses, by an officer or agent of the Quartermaster's Department, and none of it shall be painted until it shall have been inspected and approved by said officer or agent authorized to inspect it. When finished, painted, and accepted by an officer or agent of the Quartermaster's Department, and delivered as herein agreed, they shall be paid for.

The United States reserves the right to make such alterations as may seem necessary in regard to the durability of the work.

The ambulances are to be delivered at _____, at such place as the quartermaster or his agent may designate, and the contractor to assist in taking them apart for shipping. It is agreed that _____ of the ambulances complete shall be ready for delivery on or before the _____ day of _____, 18_____, on or before the _____ day of _____, and the remainder on the _____ day of _____, 18_____.

In case of failure on the part of the contractors to make and deliver the work at the time aforesaid, and in the manner specified in this agreement, the quartermaster shall make good the deficiency by purchasing in open market, at the expense of said contractors.

It is agreed that the aforesaid _____, quartermaster, U. S. A., for and in behalf of the United States, shall pay or cause to be paid to said contractors or assigns the sum of _____ dollars for each ambulance, complete in all its parts as herein described, made and delivered agreeably to this contract.

It is expressly understood that no member of Congress shall be admitted to any share or part in this contract, or any benefit to arise therefrom, directly or indirectly.

In witness whereof we have hereunto set our hands at _____, this _____ day of _____, 18_____.

Specification of New Coolidge ambulance.

Articles of agreement, made and entered into this _____ day of _____, 18_____, by and between _____, quartermaster for United States Army, for and in behalf of the United States, and _____, witnesseth:

First. It is agreed that the said _____, _____ heirs and assigns, shall well and truly make or have made, built, and delivered, as herein stated, _____ four-wheeled ambulances of the size and description as follows, to wit:

RUNNING-GEAR.

FRONT.—Tongue 10 feet 9 inches long; from front end of tongue to doubletree bolt, 9 feet 6 inches; $\frac{1}{2}$ inch wide at jaws by 2 inches thick, and at heel of jaws 2 inches; hounds 3 feet $10\frac{1}{2}$ inches long, 2 feet $3\frac{1}{2}$ inches to front of center of axle, $2\frac{1}{4}$ inches wide at

axle, $3\frac{1}{2}$ inches at heel of jaws, $1\frac{1}{2}$ inches deep back of axle: jaws $19\frac{1}{2}$ inches long, $1\frac{1}{2}$ inches wide by 2 inches deep; from center to center of axle and slider 16 inches; hounds back of slider $16\frac{1}{2}$ inches, out to out: slider 2 feet $\frac{1}{2}$ inch long, $1\frac{1}{2}$ inches square, $2\frac{1}{2}$ inches curve: axle-stocks $3\frac{1}{2}$ inches deep over center: at collar of axle 2 inches square and rounded down: axle 4 feet $4\frac{1}{2}$ inches long: collar to collar $1\frac{1}{4}$ -inch iron: arms $7\frac{1}{2}$ inches from inside of collar to inside of linchpin hole: collar $\frac{1}{6}$ of an inch thick by $2\frac{1}{2}$ inches diameter, outside: axle fastened to stock by four half-round clips and two $\frac{1}{2}$ -inch bolts: two braces of $\frac{1}{2}$ -inch round iron extend from hounds to second clip in axle, fastened by two $\frac{1}{2}$ -inch bolts through hounds and by the second clip of axle: clips 2 inches wide: from center of end clip to center of second clip $8\frac{1}{2}$ inches: one $\frac{1}{2}$ -inch bolt goes through hounds and tongue back of brace-bolts: stay-chains 2 feet 6 inches long (twelve links to the foot), of $\frac{1}{2}$ -inch round iron, twisted and fastened through the stock by two $\frac{1}{2}$ -inch eye-bolts: doubletree plate 3 inches by 6 inches, fastened with four $1\frac{1}{2}$ -inch No. 11 screws to tongue and hounds: hasp $7\frac{1}{2}$ inches long, fastened by staple in tongue: safety-hook, $\frac{1}{2}$ -inch round iron, goes through axle-stocks and is fastened by two nuts on front of stock: two bottom braces to stiffen hounds, $\frac{1}{2}$ -inch round iron, fastened by five $\frac{1}{8}$ -inch bolts through hounds, and extend whole length of hounds: slider-plate $1\frac{1}{2}$ inches by $\frac{1}{4}$ inch: bolster-plate on top of stock 19 inches long, 2 inches wide, and $\frac{1}{8}$ inch thick: tongue-cap $9\frac{1}{2}$ inches long, $\frac{1}{2}$ -inch round iron, with open ears to admit breast-chains, flattened on sides to 1 inch, fastened to tongue by two $\frac{1}{16}$ -inch bolts: goose-neck on top of tongue for lead-horses 18 inches long, $\frac{1}{2}$ -inch round iron at bend, flat part 1 inch by $\frac{1}{2}$ inch; neck 10 inches long, fastened by three $\frac{1}{8}$ -inch bolts through tongue: breast-chains 2 feet 2 inches long, $\frac{1}{6}$ -inch iron, twisted links, eight to the foot.

HIND PART OF RUNNING-GEAR.

Three couplings $1\frac{1}{2}$ inches by 3 inches deep; middle coupling 8 feet $3\frac{1}{2}$ inches long, out to out: side coupling 8 feet $4\frac{1}{2}$ inches; between axle-stock and back-bar, 2 inches by $1\frac{1}{2}$ inches, mortised through stock and bar; 7 feet 1 inch from center of king-bolt to center of hind axle; axle-stock 2 inches by $3\frac{1}{2}$ inches in center and $2\frac{1}{2}$ inches deep at ends, left square for clips: back-bar 2 inches by $2\frac{1}{2}$ inches, mortised on the couplings: center of stock to center of back-bar $12\frac{1}{2}$ inches: tenons of couplings $1\frac{1}{4}$ inches by $1\frac{1}{2}$ inches: front bolster $3\frac{1}{2}$ inches by 2 inches, 4 feet 7 inches long, $2\frac{1}{2}$ inches on end; bearing-bars 9 inches from center to center: back of bolster 2 inches deep by $1\frac{1}{2}$ inches wide, notched on to couplings 1 inch; top bearing-bar 3 feet 3 inches long; bottom bearing-bar 20 inches long, 2 inches deep, by $1\frac{1}{2}$ inches wide; lock-bar 6 feet long by $3\frac{1}{2}$ inches wide and $1\frac{1}{4}$ inches thick; rub-blocks on bar 8 inches long, $4\frac{1}{2}$ inches wide, and $1\frac{1}{2}$ inches thick; top bolster-plate 2 feet long, $1\frac{1}{2}$ inches wide, and $\frac{1}{2}$ inch thick, fastened by four $\frac{1}{8}$ -inch bolts.

Top bearing-bar plate 4 feet 4 inches; inside of nibs $1\frac{1}{2}$ inches by $\frac{1}{2}$ -inch iron, fastened by three $\frac{1}{2}$ -inch countersunk bolts through couplings, and takes bottom-bearing-plate; bottom bearing-plate 4 feet 6 inches long out to out, turns up from outside of side couplings, and takes nibs of top bearing-bar plate.

DOUBLE-LEVERAGE LOCK.

Comprised of two connecting-rods; whole length 4 feet $1\frac{1}{2}$ inches, to be of $\frac{1}{2}$ -inch round iron, connects with levers $11\frac{1}{2}$ inches long between eyes, $1\frac{1}{2}$ inches center by $\frac{1}{2}$ inch thick, tapers to $1\frac{1}{4}$ inch at ends, fastened by brace on each side coupling 17 inches long, and is connected by $\frac{1}{2}$ -inch bolts through center of lever and through bearing-bar: braces to be of $\frac{1}{2}$ -inch round iron, another acting lever 8 inches long, $\frac{1}{2}$ inch round, connects with flat lever forked at both ends, so to lap over flat lever, and when connected form a W in shape: standing back of front bolster on center point a rod of $\frac{1}{2}$ -inch round iron connects forked at both ends, to be whole length $9\frac{1}{2}$ inches; fork to be at front end 4 inches long and flattened to $1\frac{1}{2}$ inches by $\frac{1}{4}$ inch, with two $\frac{1}{2}$ -inch holes for connecting foot-lever bolt at back end, fork inside $1\frac{1}{2}$ inches.

Lock-bar slides on side couplings $10\frac{1}{2}$ inches long in the clear, $\frac{1}{2}$ -inch half-round iron fastened through side couplings, with nuts on bottom; side plate $13\frac{1}{2}$ inches long by $1\frac{1}{2}$ inches wide, and $\frac{3}{16}$ inch thick.

Ear on front bolster for foot-lever fastened by $2\frac{5}{16}$ -inch bolts.

Connecting-rods fastened through lock-bar by one $\frac{1}{2}$ -inch bolt through each, and all levers secured by $\frac{1}{8}$ -inch rivets.

DOUBLE TREES WITH SINGLETREES.

Doubletrees 4 feet long, $1\frac{1}{2}$ inches thick, $3\frac{1}{2}$ inches across center, $2\frac{1}{2}$ inches at ends. Singletrees 2 feet 10 inches long, $2\frac{1}{2}$ inches across center, $1\frac{1}{2}$ inches at ends.

IRONS.

Doubletree plate, bottom, 6 $\frac{1}{2}$ inches long, 3 $\frac{1}{2}$ inches wide, $\frac{3}{16}$ inch thick, fastened by four 1 $\frac{1}{4}$ -inch No. 11 screws.

Bolt for doubletree 4 $\frac{1}{2}$ inches long, $\frac{1}{2}$ -inch round iron, with nut on bottom; stay-chain hooks on doubletree 5 $\frac{1}{2}$ inches long, 1 $\frac{1}{2}$ inches, secured by nut; round clip on end of doubletree 2 $\frac{1}{2}$ inches wide, open ring to secure singletree, $\frac{1}{2}$ -inch round iron; clip same as doubletree clip on center of singletree; end of singletree iron ferrule 1 $\frac{1}{2}$ inches wide by 1 $\frac{1}{4}$ inches in diameter; eye-bolt with ring attached screwed into end of singletree, made of $\frac{3}{8}$ -inch round iron, 2 $\frac{1}{2}$ inches in diameter.

Top plate on doubletree 4 inches long, 2 inches wide, secured by four 1 $\frac{1}{4}$ -inch screws.

BEARING-JACKS FOR THOROUGH-BRACES.

FRONT.—Whole length 2 feet 5 $\frac{1}{2}$ inches, 1 $\frac{1}{2}$ inches square at bottom, tapered to 1 $\frac{1}{4}$ inches at top; length from top of bolster to center of eye on straight line 23 $\frac{1}{2}$ inches, and bows back three inches; fork at bottom 5 inches, goes over front bolster; front part of fork extends 5 $\frac{1}{2}$ inches along bolster, and is fastened by three $\frac{3}{8}$ -inch bolts through bolster.

Brace for jack 22 $\frac{1}{2}$ inches long, forked at top to catch the jack, to be $\frac{1}{2}$ -inch round iron, and fastened at bottom by one $\frac{1}{2}$ -inch bolt through top and bottom bearing-plate, and also fastened by two braces $\frac{3}{8}$ -inch round iron from bearing-plates to front bolster, secured by two $\frac{3}{8}$ -inch bolts.

Shackles for thorough-braces 4 inches long, 1 $\frac{1}{2}$ inches by $\frac{1}{2}$ inch, and bolts through jack 4 inches by $\frac{1}{2}$ inch; through brace bolt through end of shackles with rollers around bolt to prevent cutting the braces.

HIND.—Whole length 22 $\frac{1}{2}$ inches, 1 $\frac{1}{2}$ inches square, tapered to 1 $\frac{1}{4}$ inches, set square on hind-bar, forked at bottom 5 inches, and goes over hind-bar, extends along back side of bar 5 $\frac{1}{2}$ inches, fastened by three $\frac{3}{8}$ -inch bolts through bar.

Brace for jack 21 inches long, $\frac{1}{2}$ -inch round iron, forked at top to take the jack; forked at bottom and riveted on top and side of axle-clip; hind shackles same as front for thorough-braces.

Whole length of jacks between eyes 7 feet 9 $\frac{1}{2}$ inches; a plate of 1 $\frac{1}{2}$ -inch by $\frac{1}{2}$ -inch iron extends along middle coupling to transit-plate, which is welded on to coupling-plate, and is fastened to front bolster by two $\frac{1}{2}$ -inch bolts, countersunk heads; coupling-plate extends back to back-bar, and is fastened to coupling by eight $\frac{3}{16}$ -inch bolts.

Side coupling-plates 1 $\frac{1}{2}$ inches by $\frac{1}{2}$ inch, turned up at front bolster $\frac{1}{8}$ inch, laps over hind axle, fastened by one countersunk bolt through bolster and seven $\frac{3}{16}$ -inch bolts through coupling; safety-catch 9 $\frac{1}{2}$ inches long, $\frac{1}{2}$ -inch round iron, 5 $\frac{1}{2}$ inches long from shoulder to bottom end, and fastened at top through middle coupling by nut; king-bolt 11 $\frac{1}{2}$ inches long by $\frac{1}{2}$ inch, round iron, 6-square head, and nut on bottom.

Hind axle 1 $\frac{1}{2}$ -inches iron (same as front, excepting king-bolt hole), fastened by two half-round clips in center, and at ends by two square clips 1 $\frac{1}{2}$ inches wide and $\frac{1}{2}$ inch thick; and also four braces; two side-braces $\frac{1}{2}$ -inch round iron; two center-braces 1 inch by $\frac{1}{2}$ inch, 16 inches long, and fastened to hind-bar by two half-round clips; side-braces fastened by two $\frac{3}{8}$ -inch bolts through hind-bar; two hoops for water-keg, lap over side couplings, fastened by $\frac{3}{8}$ -inch bolts through coupling, placed 7 $\frac{1}{2}$ inches inside of side-coupling from inside of axle-stock; four check-strap loops, two front and two back, 2 $\frac{1}{2}$ inches wide, $\frac{3}{8}$ -inch round iron, set 3 $\frac{1}{2}$ inches from back of stock (on inside of side-coupling) to center of loop.

Rubber blocks for lock-bar 7 $\frac{1}{2}$ inches long out to out, laps 1 $\frac{1}{2}$ inches on each end, fastened to lock-bar by two $\frac{3}{8}$ -inch bolts through bar.

All wood-works of running-gear to be of best quality white oak or hickory.

BODY OF AMBULANCE.

Sills 10 feet 4 inches long out to out, 3 $\frac{1}{2}$ inches wide, and 1 $\frac{1}{4}$ inches thick; body 9 feet 5 $\frac{1}{2}$ inches, out to out; width, out to out, 3 feet 9 inches; height of sides 16 $\frac{1}{2}$ inches; rail on top of sides 1 $\frac{1}{2}$ inches by 1 $\frac{1}{2}$ inches, rabbeted on side-board $\frac{1}{2}$ inch; five bars 2 $\frac{1}{2}$ inches wide by 1 $\frac{1}{2}$ inches thick, and double-shouldered; $\frac{3}{8}$ -inch tenon mortised on sills 2 $\frac{1}{2}$ inches; tail-pieces 2 $\frac{1}{2}$ inches deep by 2 inches wide, extends over on each side of body 5 inches.

Foot-board 12 $\frac{1}{2}$ inches wide in center; at ends on sill tapers to 10 $\frac{1}{2}$ inches.

Toe-board 3 $\frac{1}{2}$ inches wide, placed on front end of foot-board; rocker on side of body for thorough-braces 5 feet 10 inches long, out to out, 3 $\frac{1}{2}$ inches wide by 1 $\frac{1}{2}$ inches thick; from bottom of rocker to straight line across top 7 $\frac{1}{2}$ inches, of an easy curve or circle from end to end.

Tail-board plain, $\frac{3}{4}$ -inch white-pine stuff, same height as sides; sides of $\frac{3}{4}$ -inch poplar, when dressed; bottom $\frac{3}{4}$ -inch white-pine boards.

Seven studs on each side $1\frac{1}{2}$ inches by $\frac{1}{4}$ inch beside the bows; from front stud to center second stud back $15\frac{1}{2}$ inches; from second stud to third stud 4 feet $7\frac{1}{2}$ inches; from third to fourth studs 9 inches, from fourth to fifth studs 2 feet $2\frac{1}{2}$ inches.

End side-rail for seat $1\frac{1}{2}$ inches by $1\frac{1}{4}$ inches, extending from front rail to second bow, and fastened to side rail by eight $\frac{1}{4}$ -inch rivets.

Six bows, divided ($1\frac{1}{2}$ inches by $\frac{1}{4}$ inch) equal distances, and mortised into sills.

Box in front, whole width of body, $12\frac{1}{2}$ inches wide, same depth as sides from bottom; batten on top of back of box $2\frac{1}{2}$ inches by 1 inch; lid to come flush with front of body, fastened by 2 6-inch T-hinges, and secured by hasp and staple for lock in front; lower bottom of lazy-back secured to top of box, $3\frac{1}{2}$ inches wide; lazy-back $11\frac{1}{4}$ inches wide in center, at ends $9\frac{1}{2}$ inches by 1 inch thick, white pine, secured to bottom lazy-back by 2 6-inch T-hinges.

Top side-board 5 feet $7\frac{1}{2}$ inches long, $7\frac{1}{2}$ inches wide, placed on second bow front, and goes to second bow back, and is fastened to 2 center bows by 12 1-inch No. 11 screws; arm-rail $1\frac{1}{2}$ inch wide by $\frac{1}{4}$ inch thick, and placed one foot to center, above top side-board, extending whole length of bows, and fastened by 1 rivet in each bow.

Lazy-back, for single seats, 4 inches wide, $\frac{1}{4}$ inch thick, extending from second bow back to back bow, placed on top of arm-rail, fastened by 6 1-inch screws.

Single seats, back, 19 inches long, 13 inches wide, 1 inch thick, white pine, and are fastened to top rail by 2 6-inch T-hinges.

Ridge-pole 10 feet $7\frac{1}{2}$ inches long, whole length $1\frac{1}{2}$ inches deep by 1 inch, notched on to bows, and fastened by 6 $1\frac{1}{2}$ -inch screws.

Curtain-rails 10 feet 3 inches long, $1\frac{1}{2}$ inches deep by 1 inch thick, notched on to bows, and fastened by 6 $1\frac{1}{2}$ -inch screws; 5 half-bows, placed in center between body bows, and notched into ridge-pole and curtain-rails, and fastened by 3 1-inch screws each.

Top rack, for supporting litters, 2 feet 6 inches wide, 3 feet $4\frac{1}{2}$ inches long: 3 rails 1 inch deep by $\frac{1}{4}$ inch thick; 6 cross-rails $1\frac{1}{2}$ inches wide by $\frac{1}{4}$ inch thick, notched in flush in the side rails of rack, and fastened by $\frac{1}{4}$ -inch screws; front end of rack placed $1\frac{1}{2}$ inches from front of front row, and fastened on top of curtain rail by 6 $\frac{1}{4}$ -inch screw-bolts.

Curtain-rail placed 3 feet above lower side-board: baggage-rack 3 feet $9\frac{1}{2}$ inches long, 23 inches wide, constructed of 3 iron straps, with hook and loop at ends above; straps $1\frac{1}{2}$ inches wide, and $\frac{5}{16}$ inch thick, 2 feet 4 inches long; 3 inches of loop end turned up $\frac{1}{2}$ inches; hook on end of strap made to fill $\frac{1}{2}$ -inch eye; 5 wood bars on rack $\frac{1}{4}$ inch square, placed at equal distances apart, and riveted on iron straps with $\frac{1}{4}$ -inch rivets.

Hind step 3 feet long, $7\frac{1}{2}$ inches wide, 1 inch thick, placed $1\frac{1}{2}$ inches below under side of tail-piece; main step iron $1\frac{1}{4}$ inches wide by $\frac{1}{4}$ inch, turned up square at the top end $1\frac{1}{2}$ inches, and fastened by $\frac{1}{4}$ -inch bolts through tail-piece, turned square at lower end, 7 inches long; step-braces 1 inch wide by $\frac{1}{4}$ inch, half-round iron, and turned at top end $2\frac{1}{2}$ inches square, turned at lower end square $4\frac{1}{2}$ inches, and secured by $1\frac{5}{16}$ -inch screw-bolt at each end; whole length of step-braces 2 feet 9 inches.

Three strap-hinges on tail-board $\frac{1}{4}$ inch wide, $\frac{1}{8}$ inch thick, half-round iron 18 inches long, 1 staple in each: outside strap-hinges to receive leather strap which supports tail-board when up.

Rod to secure tail-board straps 2 feet 11 inches long, and $\frac{1}{4}$ -inch round iron, with head and screw-nut secured to tail-piece by 3 eye-plates, and said plates riveted to tail-piece by 3 $\frac{1}{4}$ -inch rivets in each plate.

Side-braces 18 inches long, $\frac{1}{4}$ -inch round iron, flattened at top, 5 inches long, to fit side-board; staple to receive leather strap $2\frac{1}{2}$ inches wide, and $\frac{1}{4}$ -inch round iron, riveted through brace $1\frac{1}{2}$ inches from top of brace; brace secured at top by 2 $\frac{1}{4}$ -inch rivets through back bow, secured at bottom end by 1 $\frac{1}{2}$ -inch screw-bolt.

Two slide-irons 2 feet 1 inch long, $1\frac{1}{2}$ inches wide by $\frac{1}{4}$ inch thick, turned down at end $\frac{1}{4}$ inch, and secured at bottom side of sill by 4 screw-staples, the staples are 1 inch wide by $\frac{1}{16}$ inch thick, fastened to sill by $1\frac{1}{2}$ -inch screws; two in each staple.

Rockers placed 1 inch from ends of rocker, 10 inches long, $2\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick; ears on ends (iron) $2\frac{1}{2}$ inches long by $\frac{1}{4}$ inch wide, and $\frac{1}{4}$ inch thick, secured to rocker by 2 $\frac{5}{16}$ -inch countersunk bolts; iron keeper in center and underside of rocker 4 inches long, $\frac{1}{4}$ inches wide, $\frac{5}{16}$ inch thick, turned square, $2\frac{1}{2}$ inches on outside; end fastened to rocker by 1 $\frac{5}{16}$ -inch screw-bolt; 5 $\frac{1}{2}$ -inch screw-bolts to fasten rocker to side of wagon body; hollow lock-plate $12\frac{1}{2}$ inches long, $3\frac{1}{2}$ inches wide, $\frac{1}{4}$ inch thick; curve in lock-plate 3 inches deep, $3\frac{1}{2}$ inches high, 6 inches long at base, and secured to under side of sill by 4 $\frac{5}{16}$ -inch screw-bolts, and placed 2 feet $1\frac{1}{2}$ inches into center of base of curve from front end of body; front stay-irons $13\frac{1}{2}$ inches long, $\frac{1}{2}$ -inch round iron, flattened on top end 3 inches, lower end bent to fit step, rounded, flattened, and punched to receive $\frac{5}{16}$ -inch square screw-bolt, and secured at top by 2 $\frac{1}{4}$ -inch rivets through front bow and stud.

Iron fender for toe-board 4 feet 9 inches long, $\frac{1}{4}$ -inch round iron flattened and turned at ends to fit the front step-board, braced at equal distances from the end by 2 irons, $\frac{1}{2}$ inches long, $\frac{1}{4}$ inch round, flattened at one end, to fit the step-board, and welded to toe-iron, the whole secured to step by 4 $\frac{1}{4}$ -inch rivets, and 2 $\frac{1}{2}$ -inch screw-bolts.

One lever rub-iron $12\frac{1}{2}$ inches long, $4\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick; mortise cut in center of front step-board $9\frac{1}{2}$ inches long, $1\frac{1}{2}$ inches wide, 8 round holes to receive $\frac{1}{2}$ -inch wood screws through plate.

Two braces, for under side of toe-board and stem, $9\frac{1}{2}$ inches long, $1\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, secured to under side of step and toe-board by 3 $\frac{1}{2}$ -inch bolts in each; 2 braces, for under side of step-board, 18 inches long, 1 inch wide, $\frac{1}{2}$ inch thick, and secured to under side of step-board, and under side of front-bar; two $\frac{1}{2}$ -inch screw bolts through step, and one through front-bar.

4 flat hooks to receive the handles of extension litters fastened to under side of back-bar by 2 $1\frac{1}{4}$ -inch screws each; 4 flat eye-bolts to receive handles of extension litters screwed into under side of front-bar.

Irons for single seats, length of prop 16 inches, $\frac{1}{4}$ -inch round iron, secured to seat by forked plate 9 inches wide, $\frac{1}{4}$ inch thick, plate secured to seat by 6 $\frac{1}{2}$ -inch screws.

4 rod-stays 18 inches long, $\frac{1}{4}$ inch round, fastened by nuts; 2 tail-board hooks, to secure tail-board when up, 5 inches long, $\frac{1}{4}$ inch thick, $\frac{1}{2}$ inch wide, turned down at end 2 inches; eye-plate on side to receive hook, 2 inches square, $\frac{1}{4}$ inch thick, secured to hind stud by 2 $\frac{1}{2}$ -inch rivets.

Bows 5 feet $2\frac{1}{2}$ inches from top to bottom of bow.

4 strips to run litters on, fastened to bottom of body, $\frac{1}{4}$ inch square, 6 feet long, with recesses for gum wheels of litter-frames.

LITTER-FRAME.

6 feet $3\frac{1}{4}$ inches long from bars, out to out; 19 inches wide, out to out; $2\frac{1}{2}$ inches deep by $1\frac{1}{4}$ inches thick; center-bar $2\frac{1}{2}$ inches deep curved $1\frac{1}{2}$ inches from top; pillow-board 6 inches wide, $\frac{1}{4}$ inch thick, notched flush with side-rails; wood axles for gum wheels $16\frac{1}{2}$ inches long, out to out, $1\frac{1}{4}$ inches square, with iron gudgeon 4 inches long by $\frac{1}{2}$ inch round iron; handle of litter 9 inches long, curved to $1\frac{1}{2}$ inches; gum wheels $2\frac{3}{4}$ inches diameter by $\frac{1}{2}$ inch thick; 3 strips of 2-inch webbing, whole length of frame, and fastened by 16-oz. tacks on end-pieces; 7 cross-pieces webbing, fastened on sides of litters by 16-oz. tacks at equal distances apart; top of frame to be of heavy harness-leather, drawn over frame and fastened to side-rails by 32 $\frac{1}{2}$ -inch copper tacks on each side; 9 copper tacks at each end.

Pillow $10\frac{1}{2}$ inches wide, $19\frac{1}{2}$ inches long, raised at end $3\frac{1}{2}$ inches, rounding over to leather top, fastened at ends by welt of leather and 7 japanned head-nails, by welt and 14 japanned head-nails on each side.

FOUR SEATS AND BED COMBINED.

3 feet 6 inches long, $17\frac{1}{2}$ inches wide, 1 inch thick.

Battens $1\frac{1}{2}$ inches square on each side, 2 inches from end of seat, secured by 4 12d. wrought nails each; stubs on side of seat (let in) set 4 inches from side, secured together by 2 $8\frac{1}{2}$ -inch T-hinges.

Straps to brace seat back when up, 2 feet 1 inch long, $1\frac{1}{2}$ inches wide, secured to end of seat by 6 2-inch galvanized trunk-nails; buckle part of strap $7\frac{1}{2}$ inches long; tops of seats to be of enameled leather, raised 3 inches high and welted, each seat tufted with 11 tufting buttons on each side, back and front.

Lazy-back front of enameled duck, tufted at top and bottom by 22 tufting buttons, 3 inches raise in middle.

Front cushion 14 inches wide, tufted with 11 tufting buttons, covered with enameled duck and raised flush with bows and studs.

Single seats back covered with enameled leather, and tufted with 5 buttons, raised 3 inches.

Lazy-backs for single seats stuffed plain.

All stuffed with curled hair.

STRAPS.

4 straps of leather for supporting litters, fastened round ridge-pole and secured to curtain-rails, 4 feet 10 inches long, $1\frac{1}{2}$ inches wide each.

2 straps for baggage-rack, 3 feet 10 inches long, in 2 pieces; buckle-piece fastened to curtain-rail; billet-piece fastened by 2 copper rivets to rack-loop; 2 straps with double loops, 20 inches long, $1\frac{1}{2}$ inches wide, for tail-board.

4 straps 2 feet 10 inches long, $1\frac{1}{2}$ inches wide (check straps).

4 straps 2 feet 10 inches long, $1\frac{1}{2}$ inches wide (check straps).

Thorough-braces, 62 feet long, 2 inches wide, best belting-leather, $\frac{1}{2}$ inch thick, fastened by copper rivets, looped at ends $6\frac{1}{2}$ inches, fastened together by 2 T-head bolts and thumb-nuts. All leather to be best quality, oak-tanned.

WATER-KEG.

Whole length 3 feet 6 inches, $11\frac{1}{4}$ inches bilge in the center, out to out, $8\frac{1}{2}$ inches at ends or chine, 6 1-inch wide hoops; bung-hole 5 inches long, 3 inches wide; bung 6 inches long, $3\frac{3}{4}$ inches wide, $1\frac{1}{4}$ inches thick, and fastened by a hasp of iron $\frac{1}{2}$ inch wide, $\frac{3}{16}$ inch thick and secured at ends by staples, hanging irons, 2 eye-bolts $2\frac{1}{2}$ inches long, secured by nuts and plate on inside of keg; eye-bolts set $2\frac{1}{4}$ inches between and $2\frac{1}{4}$ inches from end of keg.

WHEELS.

Hind, 4 feet 6 inches high; 16 spokes; hub $7\frac{1}{4}$ inches diameter, $9\frac{1}{2}$ inches long; front band $1\frac{1}{2}$ inches wide by $\frac{1}{8}$ inch; brow bands $\frac{3}{4}$ inch wide by $\frac{3}{16}$ inch; back band 1 inch wide by $\frac{3}{16}$ inch thick; length of box $7\frac{1}{2}$ inches; spokes at shoulder 2 inches by 1 inch; width at felloe $1\frac{1}{2}$ inches by 1 inch; bent felloes $1\frac{1}{2}$ inches deep by $1\frac{1}{2}$ inches, fastened at joints by felloe-clips and $2\frac{1}{4}$ -inch bolts; tire $1\frac{1}{2}$ inches by $\frac{1}{4}$ inch best iron, fastened by 4 single bolts; hubs gum; spokes and felloes white oak or hickory, thoroughly seasoned.

Front, 3 feet 4 inches high; spokes same as hind wheels; bands same as hind, and bolted same.

COVER OF AMBULANCE.

To be of 12-ounce cotton duck, $28\frac{1}{2}$ inches in width; 5 curtains on each side, fastened down by grummettes, staples, and pins; back curtain has 4 inch square pieces of leather sewed back and front, with square hole cut in to let rack-strap through when curtain is down.

PAINTING OF AMBULANCE.

Running-gears to be painted vermillion, to have 2 coats of lead color, 2 coats vermillion, and 1 coat varnish; blacked iron-work: body, upper part to have 2 coats lead color and 2 coats black; main body to have 2 coats lead color and 3 coats chrome yellow and varnished.

It is agreed and distinctly understood that the ambulances are to be so constructed that the several parts of any one ambulance will agree and exactly fit those of any other, so as to require no numbering or arranging for putting together, and all the materials used for their construction to be of the best quality: all the wood thoroughly seasoned, and the work in all its parts faithfully executed in the best workmanlike manner.

The work shall be inspected, from time to time, as it progresses, by an officer or agent of the Quartermaster's Department, and none of it shall be painted until it shall have been inspected and approved by said officer or agent authorized to inspect it. When finished, painted, and accepted by an officer or agent of the Quartermaster's Department, and delivered as herein agreed, they shall be paid for.

The United States reserves the right to make such alterations as may seem necessary in regard to the durability of the work.

The ambulances are to be delivered at _____, at such place as the quartermaster or his agent may designate, and the contractor to assist in taking them apart for shipping. It is agreed that _____ of the ambulances, complete, shall be ready for delivery on or before the _____ day of _____, 18_____, on or before the _____ day of _____, and the remainder on the _____ day of _____ 18_____.

In case of failure on the part of the contractors to make and deliver the work at the time aforesaid, and in the manner specified in this agreement, the quartermaster shall make good the deficiency by purchasing in open market, at the expense of said contractors.

It is agreed that the aforesaid _____, quartermaster, U. S. A., for and in behalf of the United States, shall pay or cause to be paid to said contractors or _____ assigns the sum of _____ dollars for each ambulance, complete in all its parts as herein described, made and delivered agreeably to this contract.

It is expressly understood that no member of Congress shall be admitted to any share or part in this contract or any benefit to arise therefrom, directly or indirectly.

In witness whereof we have hereunto set our hands, at _____, this _____ day of _____ 18_____.

APPENDIX 3.

WAR DEPARTMENT,
QUARTERMASTER-GENERAL'S OFFICE,
Washington, D. C., April 2, 1875.

COLONEL: A model of an ambulance body, which was left at this office by the late General J. C. McFerran, is sent to you for the consideration of the Board. The only

advantage claimed for it by General McFerran is that it can be easily folded, and thus made more convenient for transportation.

Please return the model to this office when the Board is done with it.

Very respectfully, your obedient servant,
(Signed)

M. C. MEIGS,
Quartermaster-General, U. S. A.

Col. R. INGALLS,

Assistant Quartermaster-General, U. S. A.,

President of the Board on Ambulance Specifications, Washington, D. C.

WAR DEPARTMENT,
QUARTERMASTER-GENERAL'S OFFICE,
Washington, D. C., April 2, 1875.

COLONEL: You are respectfully informed that there is in charge of the depot quartermaster in this city a number of samples of different wheels submitted to this office from time to time by manufacturers. It is suggested that it may be advisable for the Board to examine these wheels.

A wheel manufactured by the Davis Metallic Wheel Manufacturing Company, office No. 80 Broadway, New York, has this day been shown to me, and it appears to me the best wheel I have seen. It is recommended that this wheel also be examined by the Board. The agent of the company is at present in this city with a sample.

Very respectfully, your obedient servant,
(Signed)

M. C. MEIGS,
Quartermaster-General, Bvt. Maj. Gen., U. S. A.

Col. R. INGALLS,

Assistant Quartermaster-General, U. S. A.,

President of Board on Ambulances, Washington, D. C.

APPENDIX 4.

Memorandum of weights of ambulance wagons.

	Pounds.
British ambulance wagons.....	1,983
Neuss (Prussian)	672
Wheeling	700 to 800
Rucker	1,120
Evans (Paris Exhibition)	1,300
British report, p. 19, gives it.....	1,932
Howard	1,232
Tripler, very heavy.	
Swiss, very heavy.	
Mundy (Paris Exhibition, prize awarded), very heavy.	
Locati	1,974
Jeffersonville	1,180

APPENDIX 5.

[Telegram.]

ALLEGHENY CITY, PA., April 6, 1875.

RUFUS INGALLS,

Assistant Quartermaster-General, Arlington:

Ambulance will weigh between eight and nine hundred pounds complete; cannot tell exactly at present.

PITTSBURGH WAGON WORKS,
Per THOS. HARPER.

APPENDIX 6.

WAR DEPARTMENT,
QUARTERMASTER-GENERAL'S OFFICE,
Washington, D. C., April 7, 1875.

COLONEL: Inclosed to you herewith, for the consideration of the Board, is a copy of the specifications for ambulance, prepared by Lieut. Col. James A. Ekin, deputy quartermaster-general, U. S. A., in charge of the quartermaster depot at Jeffersonville, Ind., under authority from this office, dated January 25, 1875, as subsequently modified by that officer.

By order of the Quartermaster-General.

Very respectfully, your obedient servant,

M. I. LUDINGTON,
Quartermaster, U. S. A.

Col. R. INGALLS,

Assistant Quartermaster-General, U. S. A.,

President Board on Ambulances, Washington, D. C.

Specifications for ambulance built at Jeffersonville, Ind., with the modifications of Deputy Quartermaster-General J. A. Ekin.

BODY.

Length, exclusive of foot-board, 7 feet 10 inches; width, 4 feet 2 inches from out to out of frame; depth, 24 $\frac{1}{2}$ inches from top of upper panel to bottom of sill; height of body from ground to bottom of sills, 3 feet 2 $\frac{1}{2}$ inches.

SILLS.—8 feet 11 inches long from out to out (projecting 13 inches for foot-board), 2 $\frac{1}{2}$ inches wide, 1 $\frac{1}{2}$ inches deep.

FOOT-BOARD.—11 inches wide, of 1-inch ash, to rest on sills; to have a $\frac{1}{2}$ -inch round foot-iron, projecting 4 inches and raised 2 inches, with stay-iron in center; foot-iron to be secured to sills with three (3) bolts at each end, to pass through foot-board.

CROSS-BARS.—To have five (5) cross-bars in frame of body, mortised into sills; front bar 2 $\frac{1}{2}$ inches wide, 1 $\frac{1}{2}$ inches deep; back-bar, 2 $\frac{1}{2}$ inches wide, 2 $\frac{1}{2}$ inches deep, and to project 6 inches on either side for stud-braces to rest on; middle and center bars, 2 inches wide, 1 $\frac{1}{2}$ inches deep; to have one additional center-bar 2 $\frac{1}{2}$ inches wide, 2 $\frac{1}{2}$ inches deep, notched $\frac{1}{2}$ inch for sills, and projecting same as back-bar for stud-brace and rest for hind side-springs.

STUDS.—To have seven (7) studs in frame of body on each side (the bows mortised into sills forming part of the seven studs) and three (3) in front, 1 $\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, and extending to top of middle panel.

MIDDLE RAIL.—11 inches above top of sill, to be 1 $\frac{1}{2}$ inches wide, 1 inch deep.

The frame-work of body to be best quality white oak, thoroughly seasoned.

PANELS.—Lower panel of clear yellow poplar, $\frac{1}{2}$ inch thick, 11 inches wide, put in side of bows and studs; middle panel of material similar to lower, 8 inches wide, put on outside of bows and studs, and securely fastened to them with screws; top panel of ash, $\frac{1}{2}$ inch thick, 3 $\frac{1}{2}$ inches wide, with groove for middle panel to fit into, secured to bows same as middle panel. All panels to project the proper distance; upper panel to have a $\frac{1}{2}$ -inch molding on top to make a finish.

FLOOR.—Of 4-inch white pine, dressed.

BOWS.—Four (4) in number, of ash, 1 $\frac{1}{2}$ inches wide, 1 $\frac{1}{8}$ inches thick, mortised in sills of body, forming studs 1 $\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick; height, from top of door to bottom of ridge-pole, 4 feet 6 inches; top flat, with rounded corners; hind bow secured with strap-bolts, 17 inches long, to pass through sills; secured to bow with one rivet the top fastened to stud-brace bolt.

RIBS.—Of ash, equidistant between bows, 1 inch wide, $\frac{1}{2}$ inch deep, to be secured fastened to curtain-rail with screws.

CURTAIN-RAIL.—Of ash, 1 $\frac{1}{2}$ inches wide, 1 $\frac{1}{2}$ inches thick, to commence at the spring of the bows; bows and ribs to be let into the rail flush, $\frac{1}{2}$ inch being taken off thickness of bows; to be fastened to the bows with screws.

RIDGE-POLE.—Of ash, 1 $\frac{1}{2}$ inches wide, 1 $\frac{1}{2}$ inches thick, let in flush, $\frac{1}{2}$ inch being taken off bows; to be fastened to bows with screws.

BONNET.—12 inches wide; frame of $\frac{1}{2}$ -inch round iron, riveted to front bow, with brace in center screwed to ridge-pole; trimmed same as ambulance top.

BRACES.—Stud-braces: hind 23 inches, middle 19 inches long, of $\frac{1}{2}$ -inch round iron with shoulder, resting on additional center and back bars and extending to upper panel on each side of body, flattened and secured to panel with bolts and screws through

bows or studs; braces to pass through bars and be secured with nut on bottom. To have one $\frac{1}{2}$ -inch round iron brace 12 inches long, from each end of front middle rail (secured to it by bolt through corner plate), extending to foot-board and bolted to it.

CORNER-IRONS.—To have one 1-inch by $\frac{1}{4}$ -inch iron plate at each front corner on middle rail, extending 5 inches each way and secured by bolts and screws on each side of plate.

TAIL-GATE.—Material: frame-work, white oak; panel, yellow poplar $\frac{1}{2}$ inch thick. To be the width of body, with three studs, same size as in side of body, with sill and rail on top (size of middle rail), neatly and securely joined to body by two suitable bolt-hinges riveted to gate; arranged to fasten with spring-catches and boxes, to prevent body from spreading; panel to be riveted to frame.

STEP.—At back of body, of 1-inch ash, 3 feet long, 8 inches wide, 16 inches below top of floor; rests of 1-inch oval iron, to be bolted to back bar; step strengthened by braces of $\frac{1}{2}$ -inch oval iron, extending forward 14 inches, secured to sill with two (2) $\frac{1}{4}$ -inch bolts each. Rests and braces flattened and secured to step with two $\frac{1}{6}$ -inch bolts in each.

LAZY-BACK.— $4\frac{1}{2}$ inches wide, $13\frac{1}{2}$ inches from rear of front bow, fastened to front of stud; to be trimmed in front and rear same as litters.

BOX, OR DRIVER'S SEAT.—In front of body, of $\frac{1}{2}$ -inch pine, $13\frac{1}{2}$ inches wide, with hinged and cleated lid and hinged hasp and staple in front, with two partitions so arranged as to leave 19 inches space in the clear at each end: these spaces to have neat rests for water-kegs, each of which will be steadied by means of straps attached to rests, and so arranged as to buckle on top of kegs and at each end.

KEGS.—Two in number, of best quality oak; length, 15 inches; diameter, 9 inches in center, tapering to 7 inches at each end, with eight (8) hoops, $\frac{1}{2}$ inch wide: to have $\frac{1}{2}$ -inch brass globe cocks, with T-handles and timed shanks to screw in. An aperture will be cut in front lower panel on each side to allow keg to project 1 inch. Rests to be so arranged as to prevent keg from breaking panel.

WEAR-IRONS.—To be $1\frac{1}{2}$ -inch angle-iron, 6 inches long, securely bolted to sills with two (2) $\frac{1}{4}$ -inch bolts passing from outside to inside.

LITTERS.—Of $\frac{1}{2}$ -inch poplar boards, divided into (4) parts. The two boards next to panel to be 13 inches wide, the middle litter-boards 10 inches wide each, joined to panel-boards by three (3) $\frac{1}{2}$ -inch light strap-hinges; litter to rest on upright studs (four (4) on each side) of 1 $\frac{1}{2}$ -inch ash, 12 inches high, with round tenon on end, passing through floor; secured with screws; cross-pieces of ash, same thickness, let into middle rail; to have four (4) iron uprights, $\frac{1}{2}$ inch diameter, to support middle boards, with eyes, fastened to middle boards with screws; floor to have socket-plates for uprights to rest in: panel-boards of litters to be jointed 18 inches from front ends, with two (2) 6-inch light strap-hinges each, arranged to raise as pillows, when needed, by means of rods with eyes. Each board of litters to have two cleats fastened with screws to prevent warping. One panel-board to be fastened to frame of body with three $2\frac{1}{2}$ -inch butts; the other bolted to cross-pieces.

TRIMMING.—Top, curtains, and hood of 12-ounce cotton duck, $2\frac{1}{2}$ inches wide, Army standard, three (3) curtains on each side, to lap 3 inches on upper panel, and be secured by seven (7) wire staples and pins in upper panel on each side and one in center of curtain on each bow. Back curtain to be secured to rear edge of bows with two (2) staples and pins on each side and four (4) in tail-gate. Front curtain to be fastened to front rib with four (4) curtain-knobs, and arranged to fall directly in front of lazy-back, and to button to back of box with three (3) curtain-knobs. All curtains to have circular leather stay-pieces, 2 inches diameter, through which each staple and knob must pass, well sewed with well-waxed harness-thread. Staple-pins will be attached to $\frac{1}{2}$ -inch leather straps, 6 inches long, well sewed to curtains. All curtains, except front, to have roll-up straps and buckles; raw edges to be turned under; seams to be well sewed, and to have 1 inch tap: a $\frac{1}{2}$ -inch molding will be nailed to curtain-rail on each side to cover heads of tacks. Mattresses of litters and sides of body to be stuffed $2\frac{1}{2}$ inches thick with curled horse-hair and covered with best quality twilled chenille cloth. Cushion for front box of same material and thickness as mattress for litters. Edges of panel and middle boards of litters to be trimmed for finish.

RUNNING-GEAR.

MATERIAL.—Axles: Best quality refined American iron; hubs, locust or white elm, thoroughly seasoned. All other wood-work about running gear to be best quality hickory, free from defects and thoroughly seasoned.

AXLES.— $1\frac{1}{2}$ inches left square 7 inches from each collar-washer, balance round; collar-washer, $2\frac{1}{2}$ inches diameter, $\frac{1}{2}$ inch thick; wheel-boxes of best quality foundry iron, $7\frac{1}{2}$ inches long, $1\frac{1}{2}$ inches diameter, $\frac{7}{16}$ inch thick at butt; $1\frac{1}{2}$ inches diameter, $\frac{5}{16}$ inches thick at point, with two lugs, 2 inches long, $\frac{1}{2}$ inch high; oil-chamber, 2 inches long, $\frac{1}{16}$ inch deep, to commence $2\frac{1}{2}$ inches from butt; weight of box to be not less

than $4\frac{1}{2}$ pounds each. Axles to be arranged to track 5 feet from center to center of wheels. Front axle to have 1 inch curve upward at center.

WHEELS.—Height without tire: Hind, 4 feet 2 inches; front, 3 feet 6 inches; hubs, 9 inches long, $6\frac{1}{2}$ inches diameter at center, $5\frac{1}{2}$ inches at butt, $4\frac{1}{2}$ inches at point; mortised for 16 hind and 14 front spokes; size of mortise, $1\frac{1}{2}$ inches by $\frac{3}{8}$ inch, with $\frac{1}{2}$ -inch stagger. To have $\frac{7}{8}$ -inch dish.

BANDS.—Spoke-bands of $\frac{1}{2}$ -inch half-round iron; point-band, $1\frac{1}{2}$ inches by $\frac{1}{2}$ inch; butt-band, 1 inch by $\frac{3}{8}$ inch (no projection), secured by three (3) nails passing through each point and butt band.

SPOKES.—Hub-tenon, $1\frac{1}{2}$ by $\frac{5}{8}$ inches; felly-tenon, $\frac{1}{2}$ inch diameter.

FELLOES.—Two (2) pieces for each wheel, $1\frac{1}{2}$ inches deep, $1\frac{1}{2}$ inches tread.

TIRE.—Of best quality tire iron, $1\frac{1}{2}$ by $\frac{1}{2}$ inch, two (2) plates on each wheel over joint of felloes, eight bolts to fasten tire on wheels.

SPRINGS.—Platform, of No. 3 steel, “English oil-tempered,” $1\frac{1}{2}$ inches wide, seven (7) leaves; front side-spring, 3 feet 6 inches long; hind side-spring, 4 feet 3 inches long; front and hind cross-springs, 4 feet long; all to have french heads and 4 inches sweep. To be attached to front and hind axles with clips of $\frac{1}{2}$ inch square charcoal iron, with blocks 6 inches long, 3 inches deep.

HIND SIDE-SPRING, the front end to rest directly under additional center bar; attached to a 1-inch oval iron stay 19 inches long, passing under bar and secured to sill with five (5) $\frac{1}{8}$ -inch bolts, one to pass through bar and sill; stay to be properly flattened under sills; to have side brace of $\frac{1}{2}$ -inch round charcoal iron, 12 inches long, passing through spring and head (acting as brace and bolt) and secured to additional center bar with two (2) $\frac{1}{8}$ -inch bolts.

HIND CROSS-SPRINGS to rest under back-bar, with block 18 inches long, $4\frac{1}{2}$ inches deep, and proper width, springs and block to be fastened neatly and securely to back-bar with clips of 1-inch half-oval iron, best quality. Clips flattened to $1\frac{1}{2}$ inches on top.

FRONT SIDE-SPRINGS to be fastened to eye in iron under splinter-bar, with $\frac{1}{2}$ -inch-diameter bolt.

FRONT CROSS-SPRING to be clipped to block 18 inches long, 2 inches wide at top, the width of spring at bottom, and $2\frac{1}{2}$ inches deep, the blocks to be fastened to spring and end of hounds with clips of $\frac{1}{2}$ -inch half-oval iron, flattened on top.

HOUNDS.—Length, 4 feet 2 inches; jaws, 18 inches long; thickness from jaws to front of hound-bed $1\frac{1}{2}$ inches; thence thickness reduced to $1\frac{1}{2}$ inches, with 1-inch half-oval iron rod extending from splinter-bar to back of hounds, passing under and bolted to hound-bed, with ends flattened and bolted to hound; to have an iron plate on inside of jaws $\frac{1}{2}$ inch thick, the depth of hound, and 18 inches long, secured to jaws by $\frac{1}{2}$ -inch-rivet in each end.

HOUND-BED.—26 inches long, $3\frac{1}{2}$ deep, $2\frac{1}{2}$ inches wide, with iron plate $\frac{1}{2}$ inch thick bolted on under side, full length and width of bed.

TRANSOM-PLATE 17 inches long, $2\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, secured by two $\frac{1}{2}$ -inch diameter bolts, countersunk heads (passing through bed and plate), with hole to receive $\frac{1}{2}$ inch king-bolt in center. Plate to be grooved to receive upper transom-plate, thus preventing accident from breaking of king-bolt.

SIDE-BARS.— $1\frac{1}{2}$ inches square, mortised into hound-bed and splinter-bar; to have iron plates $\frac{1}{2}$ inch thick, full length and width of bars, securely bolted to them, and welded to plates under splinter-bar and hound-bed.

SPLINTER-BAR.—Length, 4 feet 4 inches, $1\frac{1}{2}$ inches square, to rest on top of hounds, with 1-inch oval iron, full length of bar, passing under hounds (with bolt through splinter-bar and hound), this iron to have two lugs on outside of hounds to hold them in place and to drop $1\frac{1}{2}$ inches below them, arranged for a half-elliptic spring, to which singletree will be attached.

To have, on top of splinter-bar, an iron plate 1 inch wide, $\frac{1}{2}$ inch thick, extending 15 inches from end and 8 inches on side bar, securely bolted to each; splinter-bar to have a 3-inch-diameter step on each end.

HALF-ELLIPTIC SPRING.—To be $1\frac{1}{2}$ inches wide, No. 3 steel, “English oil-tempered,” five (5) leaves, and 3 feet 6 inches long, secured to splinter-bar iron under hounds with two $\frac{1}{2}$ -inch-diameter bolts; to have rods of $\frac{1}{2}$ -inch best quality round iron from each end of spring, passing through hanger on splinter-bar iron, and attached with eye to singletree staple.

CHAIRS.—Consisting of three (3) bars, framed together, securely bolted to bed: center-bar, $2\frac{1}{2}$ inches thick at bottom, tapering to 2 inches thick at top, ends to show 2 inches thick; outside ones $1\frac{1}{2}$ inches thick; all bars to be 4 feet 2 inches long, 4 inches deep; upper half of transom-plate on center bar $\frac{1}{2}$ inch thick, and of width and length to fit nearly into lower half of plate on hound-bed. Plate secured with two $\frac{1}{2}$ -inch bolts, countersunk heads, passing through plate and bar.

FIFTH WHEEL.—22 inches diameter from out to out, $1\frac{1}{2}$ inches wide, $\frac{1}{2}$ inch thick, with tire or hoop $\frac{1}{2}$ inch wide, $\frac{1}{4}$ inch thick, shrunk on outer edge of lower half to receive upper half of wheel; lower half secured to hounds and hound-bed by six (6)

bolts, countersunk heads; upper half fastened securely to chair, with countersunk head bolts.

BRAKE.—Double action; side-rods, $\frac{1}{2}$ -inch round iron; front cross-rods and lock-plate rod, 1-inch round iron; lock-plate rod secured to body by iron bar $1\frac{1}{2}$ inches wide, $\frac{3}{8}$ inch thick, extending under sills 4 inches, and (fastened to them with two (2) $\frac{5}{16}$ -inch bolts) passing down in front of additional center-bar a distance of $3\frac{1}{2}$ inches (fastened to it with one (1) $\frac{5}{16}$ -inch bolt), to be arranged with eye to receive lock-plate rod. Levers on lock-plate rod 6 inches long; on near side of front cross-rods 6 inches long, on off side of proper length for foot-use. Rub blocks, $\frac{1}{2}$ inches long, 2 inches wide, $2\frac{1}{2}$ inches thick, fastened with two (2) $\frac{5}{16}$ -inch bolts. Side-rods to pass below faucet on water-kegs; front cross-rods to be secured to front of chair.

SINGLETREES.—2 feet 10 inches long; diameter, in center, 2 inches, at ends $1\frac{1}{2}$ inches, with $\frac{1}{2}$ -inch iron staple in center, passing through and riveted to the tree; tree to be attached to rod from half-elliptic spring with loose eye; ferrules $1\frac{1}{4}$ inches long; cock-eyes to be of wrought iron 3 inches long, $\frac{1}{2}$ inch diameter, with thread and $\frac{5}{16}$ -inch trace-ring, $1\frac{1}{4}$ inches diameter in the clear, attached.

TONGUE.—11 feet long (9 feet 6 inches from front of hounds), $2\frac{1}{2}$ inches wide by 2 inches thick at jaws of hounds, tapering to 2 inches wide at butt, and $1\frac{1}{2}$ inches square at front end; caps of $\frac{1}{2}$ -inch round iron; plates on sides of $1\frac{1}{2}$ by $\frac{3}{16}$ -inch iron, and extending 9 inches down tongue, secured by two $\frac{5}{16}$ -inch bolts; to have two chains in cap, 2 feet 2 inches long, of $\frac{1}{16}$ -inch twisted links, with two $\frac{1}{2}$ -inch rings in each chain, $1\frac{1}{2}$ inches diameter in the clear at one end, the other about 6 inches distant. To be fastened in jaws of hound with $\frac{1}{2}$ -inch tongue-bolt, with nut on end.

GOOSE-NECK.—Tongue to have goose-neck, for attachment of lead-bars, on top of front end, of $\frac{1}{2}$ -inch round iron, flattened to 1 inch by $\frac{1}{4}$ inch, secured to tongue with two (2) $\frac{5}{16}$ -inch bolts; neck to be not less than 6 inches long.

To have 12-inch monkey-wrench and square tar-bucket, with lid, of galvanized iron (capacity 6 pounds), with each ambulance.

PAINTING.

All wood and iron work to be finished with one priming coat of lead color, followed, when dry, by two good coats of best quality chrome yellow, in oil, shaded to color of hospital flag, with black letters—"U. S."— $3\frac{1}{2}$ inches long in third lower panel from front on each side.

WORKMANSHIP.

Spokes and wheel-boxes to be well wedged; tenons secured with wooden pins; all welds to be made smooth and strong; corners of felloes to be rounded between spokes; studs chamfered between rails; chairs and ends of all blocks chamfered and neatly finished; all clips rounded to $\frac{1}{2}$ -inch diameter, with cross-tie washers 1 inch by $\frac{1}{4}$ inch; sharp corners of bows to be removed; curtains and trimming for litters to be well fastened with "Shelton" tacks.

The ambulances are to be so constructed that the several parts of any one ambulance will agree and exactly fit those of any other, so as to require no numbering or arranging for putting together, and all the materials used for their construction to be of the best quality, and the work in all its parts faithfully executed in the best workmanlike manner.

INSPECTION.

The work shall be inspected, from time to time, as it progresses, by an officer or agent of the Quartermaster's Department, and none of it shall be painted until it shall have been inspected and approved by said officer or agent authorized to inspect it.

Prepared at Jeffersonville Depot, under authority dated January 25, 1875, and April 8, 1875, from the Quartermaster-General's Office.

APPENDIX 7.

Extract from a letter of Mr. Sterling Smith, of Brooklyn.

BROOKLYN, April 11, 1875.

I have your letter of the 8th, in which you compliment me by deferring to my opinion on the wheel question. I suppose I shall astonish you as a scientist by advising against all the new inventions and going back to the old-fashioned article; but in my opinion, for the purpose you wish to use it, a wooden wheel with elm hub, oak spokes and felloes, is altogether the most practical, and, when the best quality of timber is used, cheaper in the long run than any other. I advise oak for the spokes and felloes

rather than hickory, because if the vehicle is laid aside the oak is less liable to deteriorate or suffer from attacks of the worm. The repairing of a patent wheel is a great objection to its use, as it requires an expert, as well as oftentimes a peculiar spoke or casting which is obtainable only with much trouble, whereas in the common wheel any wheelwright has the material and ability to do it without delay.

If a patent wheel is desired, I should give the preference to the "Sarven." This is a wooden wheel with a flange surrounding the hub on either side of the spokes, which, being bolted together, serve to band the center of the hub and support the spokes as well. The iron-hub wheel generally requires a peculiar axle with an arm fitted expressly. This, in case of a break-down, is objectionable for the reason before stated.

I have heard of the Davis Company wheel, but it is little used in this vicinity, the "Sarven," among patent wheels, being the favorite and very much used.

In a subsequent letter, the same writer remarks:

"The Sarven patent wheel is manufactured by three concerns under the patent, viz: Woodburn Sarven Wheel Company, Indianapolis, Ind.; Roger Wheel Company, Cincinnati, Ohio; New Haven Wheel Company, New Haven, Conn. Either of these firms are responsible."

WAR DEPARTMENT,
QUARTERMASTER-GENERAL'S OFFICE,
Washington, D. C., April 22, 1875.

To the President of the Board on Army Ambulances, Washington, D. C.:

I should call to the attention of the Board the vehicles constructed by the wagon, carriage, and car manufactory of San Francisco, known, I think, as the "Kimball Carriage and Car Manufacturing Company." These vehicles are hung on C springs, which are made of two long laths of flexible wood, by leather braces. They have come into very general use in the Pacific States.

It is claimed that they are lighter than any metal springs, and that the vehicle is stronger, easier, and less liable to be overturned than the ordinary spring-wagon.

Senator Stewart has one or two carriages of this make, which he will doubtless allow the Board to examine, and I think it likely that it will be well worth while the cost of bringing an ambulance of this make from San Francisco, if necessary, in order that the Board may examine it.

I have ridden over very rough roads in a carriage of this make, and I am impressed with the belief that its claims are not without merit. Certainly they are worthy the attention of the Board.

Respectfully,
(Signed)

M. C. MEIGS,
Quartermaster-General U. S. A.

NO. 2313 CEDAR STREET,
Philadelphia, May 7, 1875.

SIR: We have the honor to acknowledge the receipt of your letter of the 4th instant, and inclosed please find circulars giving full particulars of price, &c., of the Sterrick new patent metallic hub wheel. We will here state our wheels are made of the same size spoke that the axles are, say $1\frac{1}{2}$ axle. We only have $1\frac{1}{2}$ spokes, but I believe the regulations call for $1\frac{1}{2}$ spokes to $1\frac{1}{2}$ axle. We can put in $1\frac{1}{2}$ spokes, but our $1\frac{1}{2}$ spokes are much stronger and lighter than any wooden hub wheel, making the wheel neat and still stronger than the wooden hub wheel.

The hubs are not made of cast iron, like other metallic hubs in the market, but are made of the best malleable iron, and also the axles are of the best brands of iron, solid collar, &c., as the price-list calls for. We could get up a wheel at a less figure, but these wheels we warrant and challenge the world.

We may be mistaken as to the size of wheels for ambulance wagons; perhaps you require a larger wheel than I have mentioned. If so, we will furnish price, &c., of any size by return mail, and if you require a sample of wheel or any further information we will be happy to give it.

Hoping this wheel may meet your favorable consideration,

I am, sir, your obedient servant,
(Signed)

GEO. W. EADLINE,
General Superintendent Philadelphia Sterrick Patent Wheel Company.

OFFICE OF NEW HAVEN WHEEL COMPANY,
224 York Street, New Haven, Conn., May 8, 1875.

MY DEAR SIR: I have the honor to acknowledge the receipt of your esteemed favor of 5th instant. In reply I beg to inclose you our latest price-list (March, 1875), on 4th page of which is a list of sizes and prices of "Sarven's patent wheels." I also inclose an old price-list in pamphlet form containing diagrams, explanations, and recommendations of this now celebrated wheel.

I am compelled to send you old recommendations, &c., as the wheel now being so well known we do not consider it necessary, so far as the "trade" is concerned, to do more than issue simple lists (like the March list inclosed) containing sizes and prices only.

Should you desire any additional information for your Board I beg you will command us at any time, or should your Board desire the presence of one of our company in Washington its wishes shall be complied with.

I remain, sir, with respect, your very obedient servant,

(Signed)

EDWARD E. BRADLEY,
Of New Haven Wheel Company.

OFFICE OF CORNING & Co.,
Albany, N. Y., May 15, 1875.

DEAR SIR: Your esteemed favor of the 13th duly received. As we are agents for the sale of the "Archibald patent iron hub wheel," we may not be a proper party to ask in regard to the merits of this wheel over those of other manufacturers. There are a good many in use in this city both for light and heavy work. We have not as yet been called upon to furnish any portion of a wheel for repairs, while we have known the "Sarven" wheel to give out completely. We are selling wheels for $2\frac{1}{2}$ tire and $2\frac{1}{4}$ Bessemer steel axles that we guarantee to stand 5 to 6 gross tons loads over rough roads. Wheels with $1\frac{1}{2}$ -inch steel tire and steel axles will carry 1 ton over the roughest road that can be found. Our honest opinion is they are the best wheel made. We should be glad to send a sample set of such size and height of forward and hind wheels, with iron or steel axles, as you may think best adapted to your wants.

Very truly yours,

(Signed)

CORNING & CO.

CONGDON, CARPENTER & Co.,
CORNER CANAL AND ELIZABETH STREETS,
Providence, Fifthmonth 17, 1875.

DEAR SIR: Replying to your inquiry regarding comparative merits of patent wheels, beg to say that our impartial judgment is that the "Archibald" iron-hubbed wheel is the best wheel in the country. Its mode of manufacture insures absolute solidity in the hub.

Yours, most respectfully,

(Signed)

CONGDON, CARPENTER & CO.

CONCORD, N. H., May 17, 1875.

DEAR SIR: Yours of the 12th instant is at hand, and contents noted.

We think wooden hub wheels the best, everything taken into consideration, if they are thoroughly seasoned, of good stock, and well made. In very light wheels the carriage rides easier, and in heavy wheels the axles are less liable to break.

If patent wheels are to be used, we prefer the "Sarven," up to and including $2\frac{1}{4}$ -inch axles; but above that size, say $2\frac{1}{2}$ inches and upward, think the Archibald iron hub wheel may do as good service. The Davis Metallic Wheel Company we do not know anything about.

Yours, truly,

(Signed)

ABBOT DOWNING CO.,
L. DOWNING, JR., *President.*

PORTLAND, ME., May 19, 1875.

DEAR SIR: Yours of the 12th instant is received and contents carefully noted. In reply would say that from a lack of knowledge of Sarven's patent wheel and Davis's metallic wheel we are unable to give our opinion regarding the comparative advantages of the same. As for the Archibald iron hub wheel, we can safely recommend that as being the best wheel for a model ambulance wagon, and for all kinds of heavy

and express wagons. In our estimation it is far ahead of any wheel we have ever seen. It is exceedingly neat in appearance, and when the tire is once properly set it never requires a second setting. There are nearly one hundred and fifty sets in use in and about this city, some of which have been running constantly for more than three years without having a tire set the second time, or any repairs whatever. They are made of the best of stock, and are warranted. We think you will be perfectly safe in ordering the Archibald wheel. Should you require it we can send you the names of seventy-five or a hundred men who will testify to what we have said in regard to the wheel.

Yours, very respectfully,
(Signed)

G. M. STANWOOD & CO.

QUARTERMASTER'S OFFICE,
No. 1139 Girard Street, Philadelphia, May 19, 1875.

CAPTAIN: In compliance with request contained in your letter of the 12th instant, I have the honor to inclose herewith reports of Wilson, Childs & Co., Fulton, Walker & Co., John Beggs & Son, and Wm. Garner & Son, on Sarven's patent, Archibald iron hub, and Davis metallic wheel.

Very respectfully, your obedient servant,
(Signed)

J. J. DANA,
Major and Quartermaster, Bvt. Brig. Gen., U. S. A.

[Inclosures to preceding letter.]

PHILADELPHIA, May 18, 1875.

GENERAL: We are in receipt of your favor of the 14th instant, asking our opinion relative to the comparative merits of the Sarven patent wheel, Archibald iron hub wheel, and the Davis metallic wheel, said information being desired for the use of a Board on Ambulance Wagons in session at Washington, D. C.

Perhaps the Board will think we are not the proper parties to give an opinion on this point at this time, for since we last built any wagons or wheels for your department we have secured the right to make the iron hub wheel by the Archibald patent press process; having first satisfied ourselves of the superiority of this wheel over that of any other as to durability, strength, neatness, cheapness, &c. It is also much easier repaired than any other wheel, requiring only the same process to repair for spokes and felloes as the old style wood hub, hand-made wheel, and to put in a new box or hub (which can be done in twenty minutes), you have only to remove the bolts, take out the hub, and put in the new one, *without cutting the tire*; all of which can be done by any one, as it cannot be done wrong.

No description of this wheel can be written that would give as good an idea of its strength as to see (even only for a few minutes) the process of manufacture. The patent is only on the process of manufacture, as we have been making the same wheel by hand for the past twenty-five years.

We inclose circular of a description of the wheel and machine, and will be pleased to give you any other information you may wish, or to show you at our factory the process of manufacture.

Very respectfully, your obedient servant,
(Signed)

WILSON, CHILDS & CO.

J. J. DANA,
Major and Quartermaster, Bvt. Brig. Gen., U. S. A.

PHILADELPHIA, May 18, 1875.

SIR: Yours of the 14th received, and would have been answered sooner but for the absence of the writer. In regard to the wheels mentioned, we have used the Sarven wheel to a considerable extent, and consider it a very good wheel for ordinary purposes; the only fault we have ever found in them is the rotting of the hub under the flange, which occurs from the destruction of the continuity of the fibers of the wood under pressure. The Archibald wheel we have also used to some extent, and is the strongest patent wheel we know of; the fault we have with them is the trouble we have had with them heating; they seem to require constant watching. The other wheel you mention we do not know anything about, never having had any experience with it. Were it not for the trouble we have had with the friction in the Archibald wheel we would give it the preference and would consider it the most desirable for Army work.

Yours, respectfully,
(Signed)

FULTON, WALKER & CO.

J. J. DANA,
Major and Quartermaster, Bvt. Brig. Gen., U. S. A.

PHILADELPHIA, May 17, 1875.

DEAR SIR: We are in receipt of your favor of the 14th asking our opinion of the merits of the Sarven, Archibald, and Davis, metallic wheel.

The Davis metallic wheel we have never used. We have used a large number of the Sarven wheel, and we find that the hubs are so small that there is not sufficient wood to wedge the axle-box properly, and that the outside of the hub frequently splinters off, and the rain getting in rots the hub. We have discarded the use of all the wood-hub patent wheels and use nothing but the Archibald iron-hub wheel, which seems to meet all the objections made to patent wheels. We have some of them in use for two years, and they are giving full satisfaction to our customers. In our opinion they are the best wheel for government service on account of uniformity in size of box and in being easily repaired. (The Sarven wheel cost us about 30 per cent. more for repairs.)

Yours, respectfully,
(Signed)

JOHN BEGGS & SON,
342 North Front Street.

J. J. DANA,
Major and Quartermaster, U. S. A.

PHILADELPHIA, May 17, 1875.

DEAR SIR: In answer to yours of 14th instant, we would say that we have used the Sarven patent wheel, from Roger Wheel Company of Cincinnati, upon our light and medium wagon-work, to our entire satisfaction.

The Archibald iron-hub wheels we have used with equal satisfaction upon heavier wagon-work.

The Davis metallic wheel seems all right in theory, but we have no practical knowledge of them.

For ambulance-wagons we should give the preference to the Sarven patent wheel.
Very respectfully, yours,

(Signed)

W. GARNER & SON.

General J. J. DANA,
Quartermaster, U. S. A., Philadelphia.

APPENDIX 8.

WAR DEPARTMENT,
QUARTERMASTER-GENERAL'S OFFICE,
Washington, D. C., April 6, 1875.

COLONEL: You will please furnish this office, for the information of the Board on Ambulances, a report of the probable weight of the kind of ambulances being manufactured under your recent contract with the Pittsburgh Wagon Works, Allegheny City, Pa.

By order of the Quartermaster-General.

Very respectfully, your obedient servant,
(Signed)

M. I. LUDINGTON,
Quartermaster, U. S. A.

Lieut. Col. JAMES A. EKIN,
*Deputy Quartermaster-General,
In charge of Quartermaster Depot, Jeffersonville, Ind.*

[First indorsement.]

JEFFERSONVILLE DEPOT, QUARTERMASTER-DEPARTMENT,
Jeffersonville, Ind., April 10, 1875.

Respectfully referred to Capt. Addison Barrett, military storekeeper, United States Army, Jeffersonville, Ind., for the information called for within, and return of this paper.

(Signed)

JAMES A. EKIN,

Deputy Quartermaster-General, U. S. A., in charge of Depot.

[Second indorsement.]

JEFFERSONVILLE DEPOT, QUARTERMASTER'S DEPARTMENT,
Jeffersonville, Ind., April 19, 1875.

Respectfully returned to Lieut. Col. Jas. A. Ekin, depot quartermaster.

After careful computation, it is found that the weight of the ambulance will be about eleven hundred and eighty pounds.

(Signed)

ADDISON BARRETT,
Captain and Military Storekeeper, U. S. A.

[Third indorsement.]

JEFFERSONVILLE DEPOT OF THE QUARtermaster's DEPARTMENT,

Jeffersonville, Ind., April 20, 1875.

Respectfully returned to the Quartermaster-General of the Army, inviting attention to report of Capt. Addison Barrett, military storekeeper, United States Army, contained in the second indorsement hereon.

(Signed)

JAMES A. EKIN,
Deputy-Quartermaster General, U. S. A., in charge of Depot.

[Fourth indorsement.]

WAR DEPARTMENT, QUARtermaster-GENERAL'S OFFICE,

Washington, April 23, 1875.

Respectfully referred to Col. R. Ingalls, assistant quartermaster-general, U. S. A., president of Ambulance Board, this city.

This information was obtained at verbal request of Assistant Surgeon G. A. Otis, member of the board.

By order Quartermaster-General.

(Signed)

M. I. LUDINGTON,
Quartermaster, United States Army.

APPENDIX 9.

JEFFERSONVILLE DEPOT OF THE QUARtermaster's DEPARTMENT,

Jeffersonville, Ind., April 15, 1875.

GENERAL: I have the honor to transmit herewith inclosed, for your information, three copies of the revised and modified specifications for the ambulance to be constructed, under contract, at Allegheny City, Pa., by the Pittsburgh Wagon Works, and also one complete set of "tracings" of the ambulance, which have been prepared at this depot, in accordance with the above-named specifications.†

In connection herewith, I respectfully invite the attention of the Quartermaster-General to my letter of the 27th ultimo.

Very respectfully, your obedient servant,

(Signed)

JAMES A. EKIN,
Deputy Quartermaster-General, U. S. A., in charge of Depot.

The QUARtermaster-GENERAL OF THE ARMY,

Washington, D. C.

APPENDIX 10.

WATERVLIET ARSENAL,

September 8, 1875.

MY DEAR DR. OTIS: I am very glad to receive your note of the 6th and thank you for sending me the book. I have immediately sent to Albany for it and hope to get it safely in a few hours.

I have only been restrained from asking you to give us another visit by the delay forced upon me by the New Haven Company, which agreed to supply me with the boxes and parts of wheels, which I wished to finish and apply before troubling you to make another journey. As I am advised that these were shipped on the 4th, I think I shall doubtless be all ready to see you at the time you mention that you may probably come. Your note, in mentioning the views of your friends about the size of the fifth-wheels, renews my anxiety to have the size increased. In studying the matter with the master, it seems practicable, at small cost for loss of finished work and alterations, to increase the diameter to 27½ inches, thus giving greater stability to the body, sufficient, it is believed, for all the necessities of service. We have the iron work of three finished and the wood-work of all, but I find that I can piece out the iron parts to the extent named, and can change the chairs and beds by readily-made expansion so as to attain a workmanlike finish, and at small additional expense, even if we now alter all, which I would advise.

2d. I have been greatly troubled by the evident *troublesomeness* in store for you, in

* Tracings omitted.

† For specifications of this ambulance see APPENDIX 6, p. 68, ante.

attempting to manage your litters, having their many legs, requiring each a separate means to tie up and unloose, especially as you have them jointed for walking in two directions at the same time.

It should be possible for a man at the rear of the ambulance to release or secure all the supports on each bench by one motion, without the necessity of handling each support. I have thought of and applied a means which I think works very satisfactorily, and suggest it to you for approval. I attach a shifting rod to pivots on each support of each bench, and thus by a single clamp or catch fold up and secure all on that bench, and by two all on one litter, so we can push in or draw out by rolling, or raise up on the feet, or lower on the rollers, each litter without the perplexing labor of getting the hand (where the hand ought not to be) near the *articulations of the legs* (in medical language?). Don't you think that the many hinges, &c., introduced by the English to enable them to fold up for shipment their ambulance bodies would prove an unnecessary expense in our service, *except* upon very special occasions, perhaps? You know an ambulance would probably never be needed for us in England by the army (certainly not a folding-up one), because they think, no doubt, that all English wars will be conducted away from the "tight little isle," and hence all such war-wagons or ambulances must expect to be packed for transportation on shipboard. As we will need ours on this continent, we may wear out a goodly number without finding it necessary to ship any. We find in shipping field-carriages by rail that platform-cars carry them on their wheels more safely and nearly as compactly as if taken apart. I only suggest this, however, for your future consideration, not for present action.

Will you be good enough to mention to the Chief of Ordnance what you have heard about the Davis wheel? About the springs, I have no doubt that your friend's views are correct, and that the upper or main leaf should be thicker than the others. As all are now finished, they could not be altered without some delay and expense; but if you think it best to make this or the other alterations, please advise me as soon as you can.

Anticipating the pleasure of soon seeing you here, I am, very sincerely, yours, very hurriedly.

(Signed)

P. V. HAGNER.

I will be in Philadelphia on the 14th and 15th, at the Continental, and, should you be there, would be glad to see you.

P. V. H.

Dr. GEO. A. OTIS,
Assistant Surgeon, U. S. A.,
Surgeon-General's Office, Washington.

WATERVILLE ARSENAL,
West Troy, N. Y., September 18, 1875.

MY DEAR SIR: I have returned from my trip to Philadelphia, and find here yours of the 11th. I presume that you propose that I should enlarge the fifth-wheel, as suggested, and I am accordingly going on with that change. I think that you will like the method of elevating and lowering the legs and fastening them in place, but I leave this for you to see before changing. There are still some details necessary to be attended to relative to cushioning.

I inclose a letter just received from the Davis Metallic Wheel Company, which I forward to you for such action as you may deem necessary. Hoping to see you very soon, that all unsettled details may be arranged,

I am, dear doctor, very truly and sincerely, yours,
(Signed)

P. V. HAGNER,
Brevet Brigadier-General, U. S. A.

Dr. GEORGE A. OTIS,
Assistant Surgeon U. S. A., Washington City.

I do not think that I ought to alter the drawings until you arrive, when it can be quickly and satisfactorily done as you may suggest. I have drawn up a description of all changes for the specifications.

P. V. H.

APPENDIX 11.

Memorandum of the plan of H. N. Jasper.

"A manumotive bullet-proof ambulance" convertible into a portable rifle-pit. It is also well adapted to relieving exposed posts, and for conveying ammunition and other supplies to sharpshooters and skirmishers.

With it two men of the ambulance corps can bear off from the line-of-battle two wounded men at once, and all four (both going and coming) be almost entirely safe from musketry, canister, or even grapeshot. The force of the balls striking the ambulance is not resisted, but the balls are deflected.

Two sharpshooters, while behind this portable rifle-pit, might advance upon and receive the fire of a brigade for hours and retire with impunity.

APPENDIX 12.

WATERVLIET ARSENAL,
West Troy, N. Y., January 10, 1876.

SIR: I ship the four ambulances, with the four varieties of litters, and the medical store-cart, with its boxes, together with the two models sent to me by you and one of our three models made here. These are to be packed in a car to go through to Washington without change, via Canandaigua, Williamsport, and Baltimore, to arrive on the 15th instant. I have thought it safest to send a workman to unpack and reassemble the vehicles, and hope to be present myself also. Will you please let the commanding officer of the Washington arsenal know whether the Board desire the vehicles to be sent to the arsenal or elsewhere, and also where the models should go? The necessary harness accompanies each vehicle.

Very respectfully, sir, your obedient servant,
(Signed)

P. V. HAGNER,
Colonel of Ordnance, Commanding.

DR. GEORGE A. OTIS,
Surgeon General's Office, Washington City, D. C.

APPENDIX 13.

ORDNANCE OFFICE, WAR DEPARTMENT,
Washington, January 19, 1876.

GENERAL: I have the honor to inform you that the ambulances made at the Watervliet arsenal are at present stored at the Washington arsenal, subject to your orders. Col. P. V. Hagner, Ordnance Department, is at present in this city, and has been directed to report to you in person, should you desire to consult him in regard to the manufacture, &c.

Very respectfully, your obedient servant,
(Signed)

S. V. BENÉT,
Brigadier-General, Chief of Ordnance.

THE BOARD ON AMBULANCES,
Washington, D. C.

HARRISBURG, PA., January 12, 1876.

DEAR SIR: I noticed some time ago by the newspapers that a Board of Army Officers was shortly to assemble in Washington for the purpose of considering the best model for a standard ambulance for the use of the United States Army in the summer of 1876. General Rucker, myself (who was at the time Superintendent of the Government Repair Shops), and a Mr. Smith patented what we then thought and what we yet think, with all the changes, the best ambulance in existence.

I am well aware that the late Franco-Prussian war developed many new ideas, but in many instances theory and not practice is taken for the best. We think that in our ambulance we have all the comforts for the wounded that is possible to give them in an ambulance, and that it is so simple that no objection can be raised to it. General Barnes was so much pleased with it that he had one built and sent to the Paris Exposition. All the Medical Board at that time in Washington were loud in its praises, and the War Department ordered 200 of them to be built; but, the war closing, the order was countermanded. Now, I think, my dear sir, if you will look at it carefully, you can find very few objections to it. It is true there may be an objection to the upper berths swaying too much. Well, it is very seldom that more than two severely wounded would be put in one vehicle. Then let the upper berths form the backs of the lower seats, and use, for instance, one litter below and one seat to carry slightly wounded; but to carry four severely-wounded men, it is the best combination

that can be made. The Tripler, the Wheeling, and all others that ever I saw were mere butcher-carts alongside of this.

So far as your suggestion goes of having an ambulance that could be taken apart and packed in a smaller space than the ordinary ambulance wagons, that is a very good idea, and a wagon could be so constructed; but I am doubtful if it would be practicable. But the interior comforts is what our patent aims at, and we sincerely hope that our claims may not be overlooked.

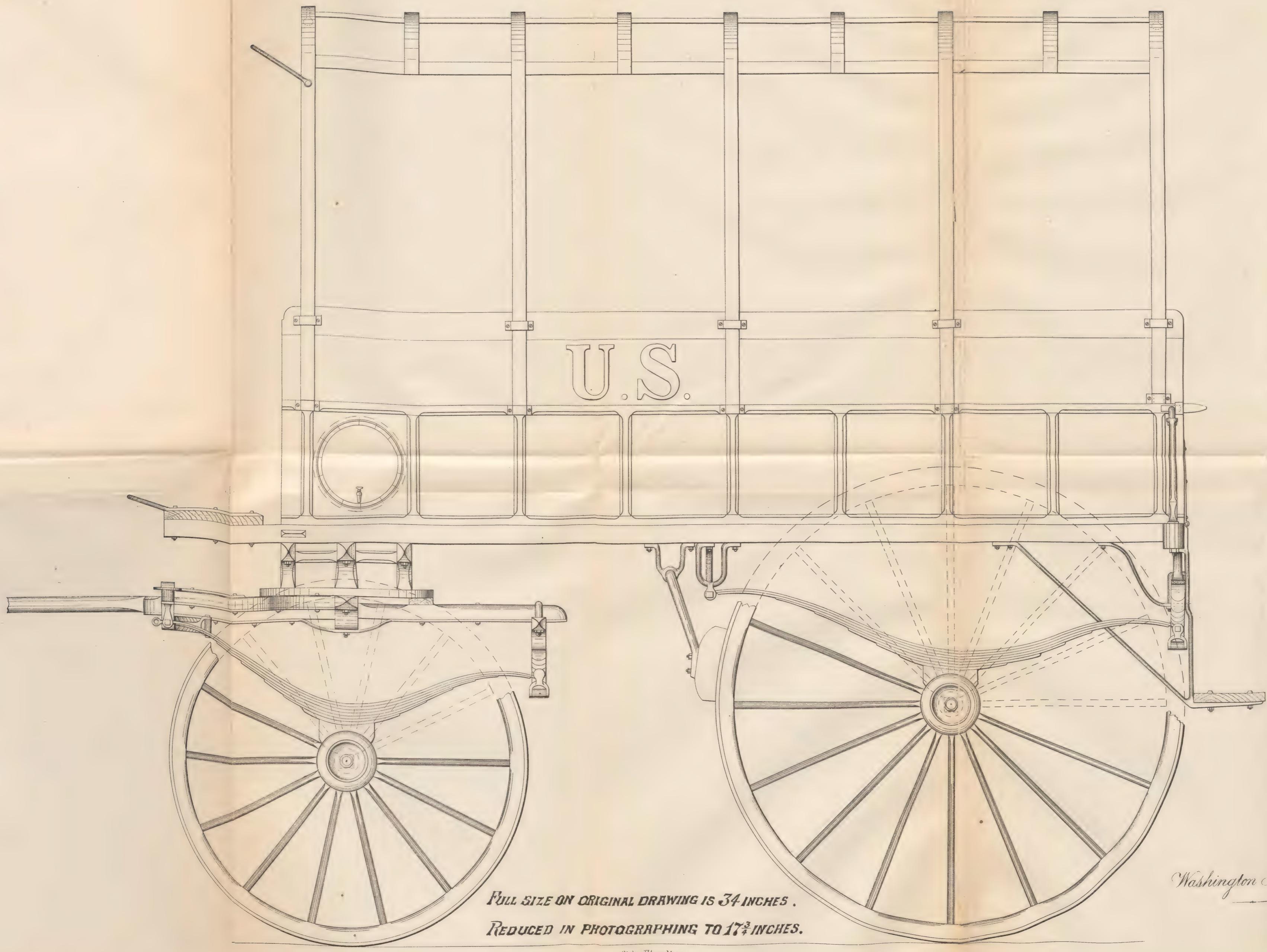
I do not know what ever became of the original ambulance that we built after our patent, but suppose it is somewhere in or about the depot. I know there is a model in the Medical Department.

If you think that my personal appearance before the Board would be of any service to us, I would be glad to go before it, providing you would be kind enough to let me know when they meet.

Yours, with respect,
(Signed)

J. E. ALLEN.

THE BOARD ON AMBULANCES, *Washington, D. C.*



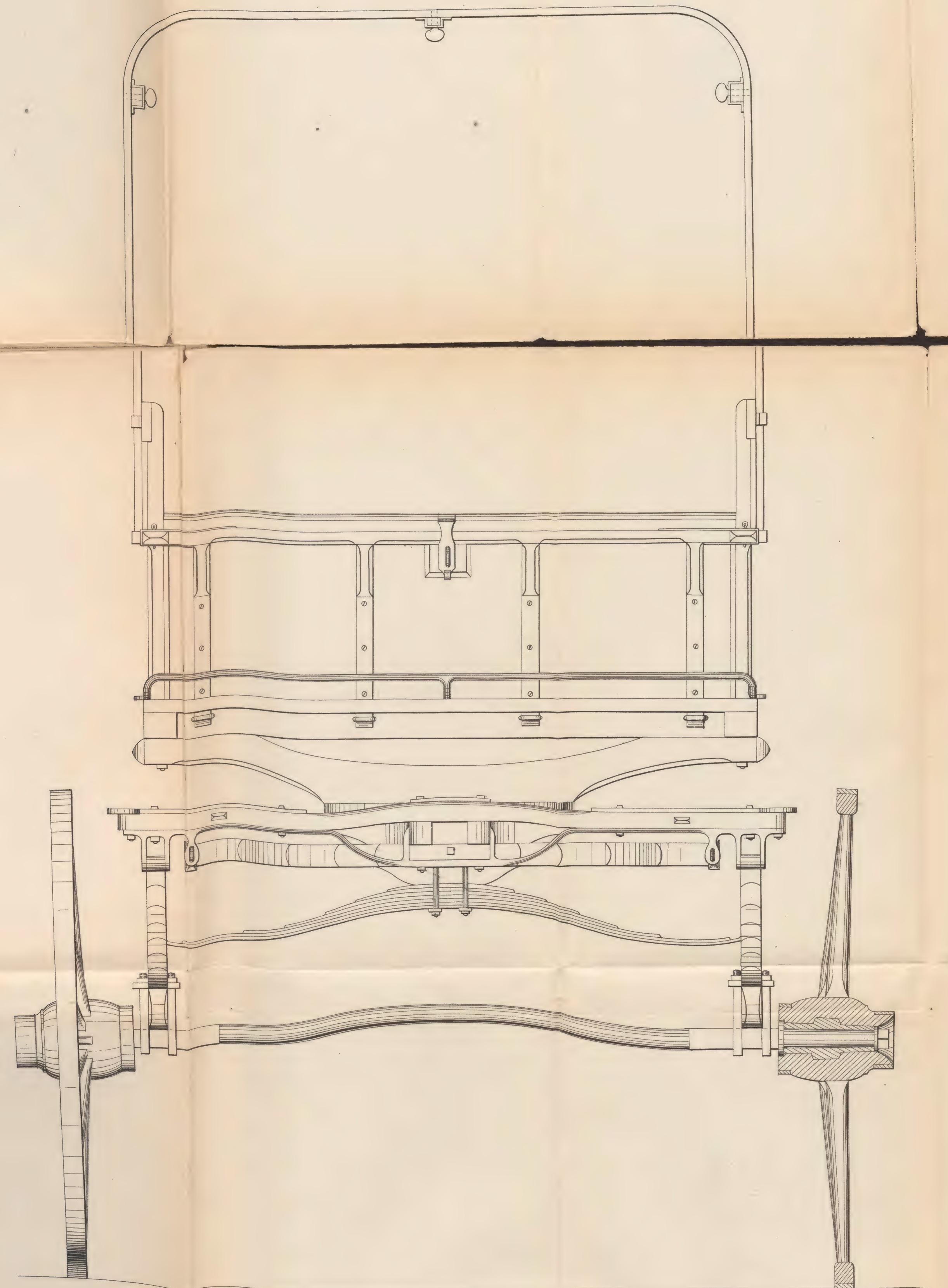
FULL SIZE ON ORIGINAL DRAWING IS 34 INCHES.

REDUCED IN PHOTOGRAPHING TO 17 $\frac{3}{4}$ INCHES.

Side Elevation

Washington Ambulance





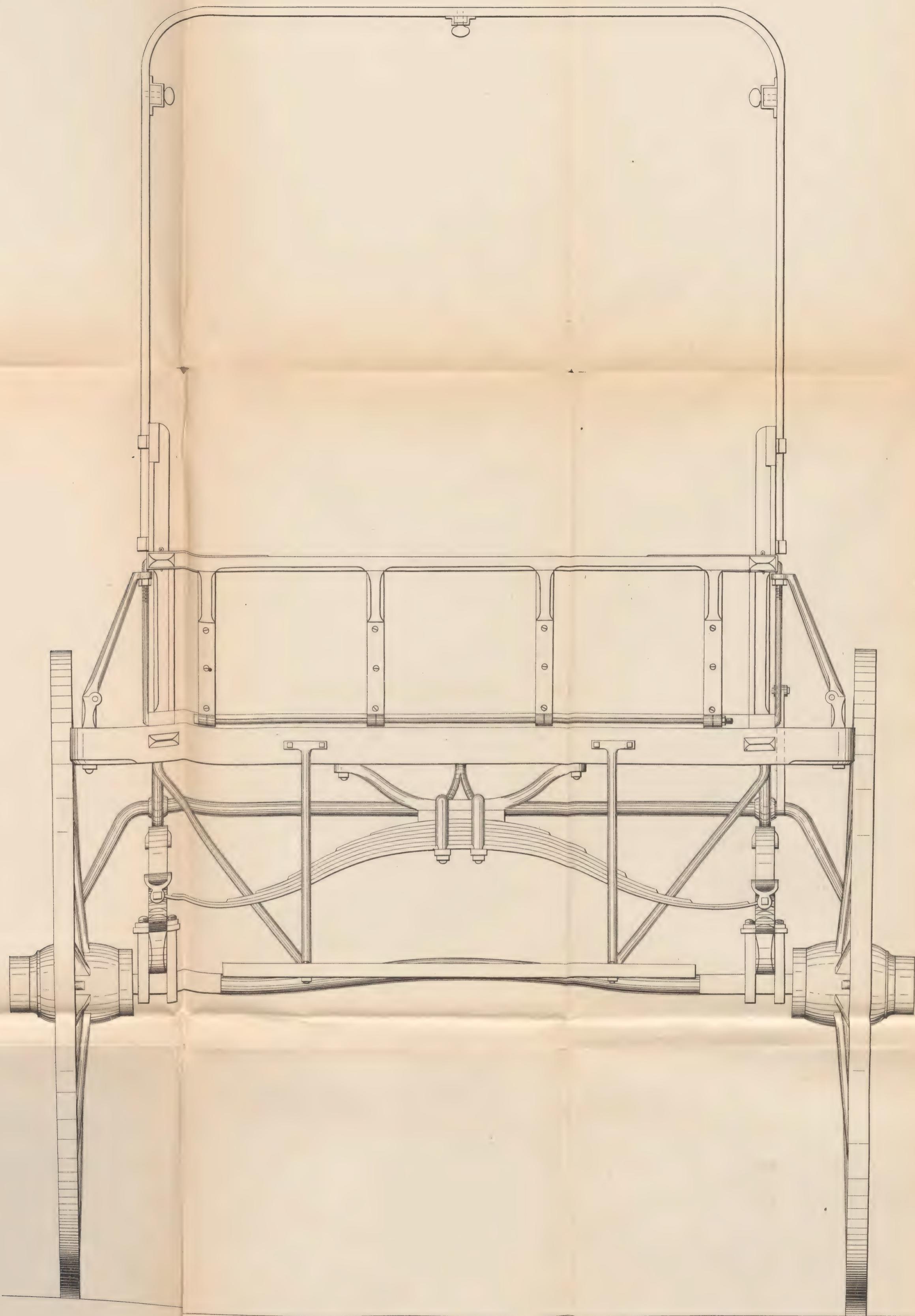
Front Elevation.

*FULL SIZE ON ORIGINAL DRAWING IS 24 $\frac{1}{2}$ INCHES.
REDUCED BY PHOTOGRAPHING TO 17 INCHES.*

A

Washington Ambulance





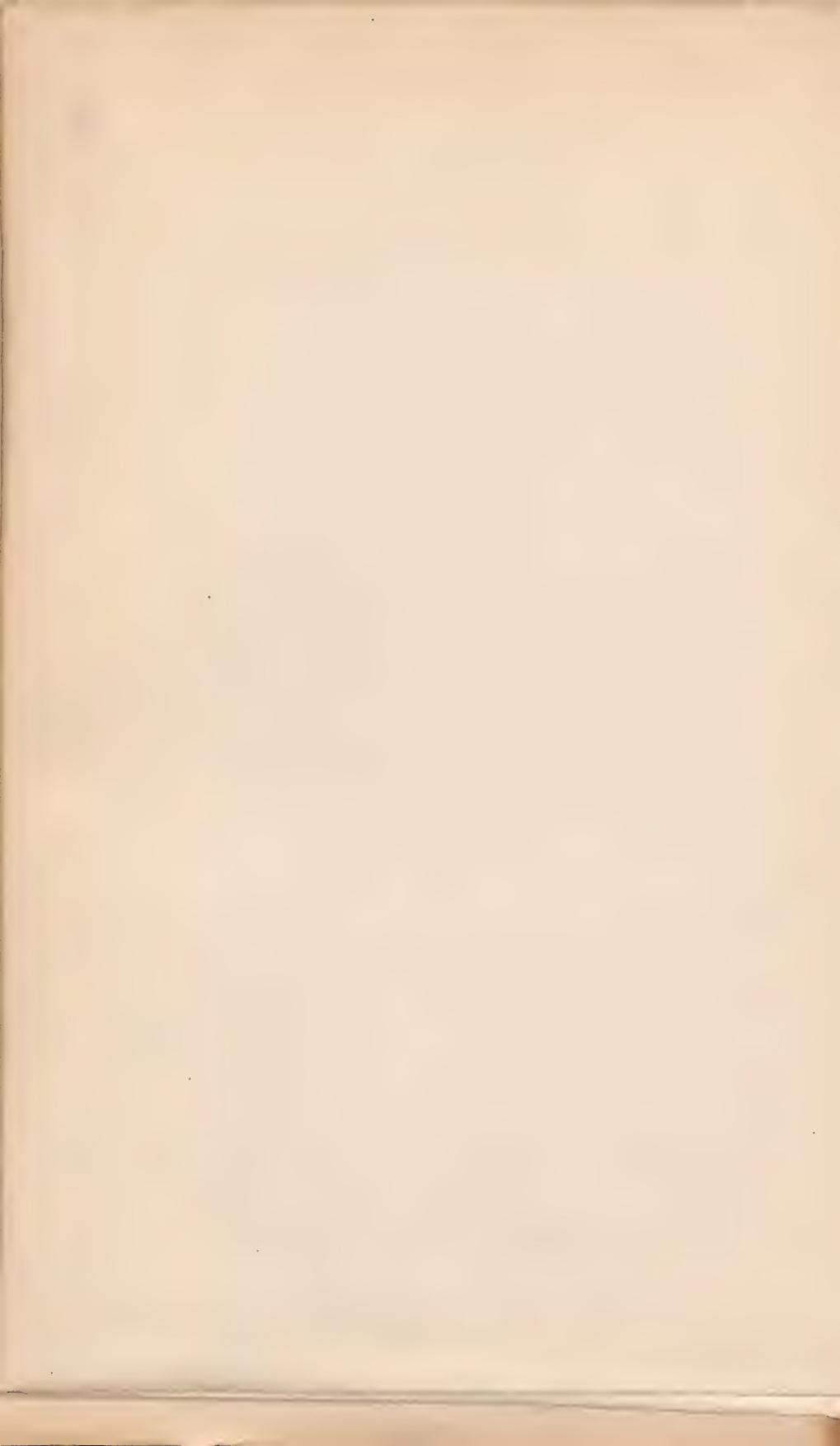
A

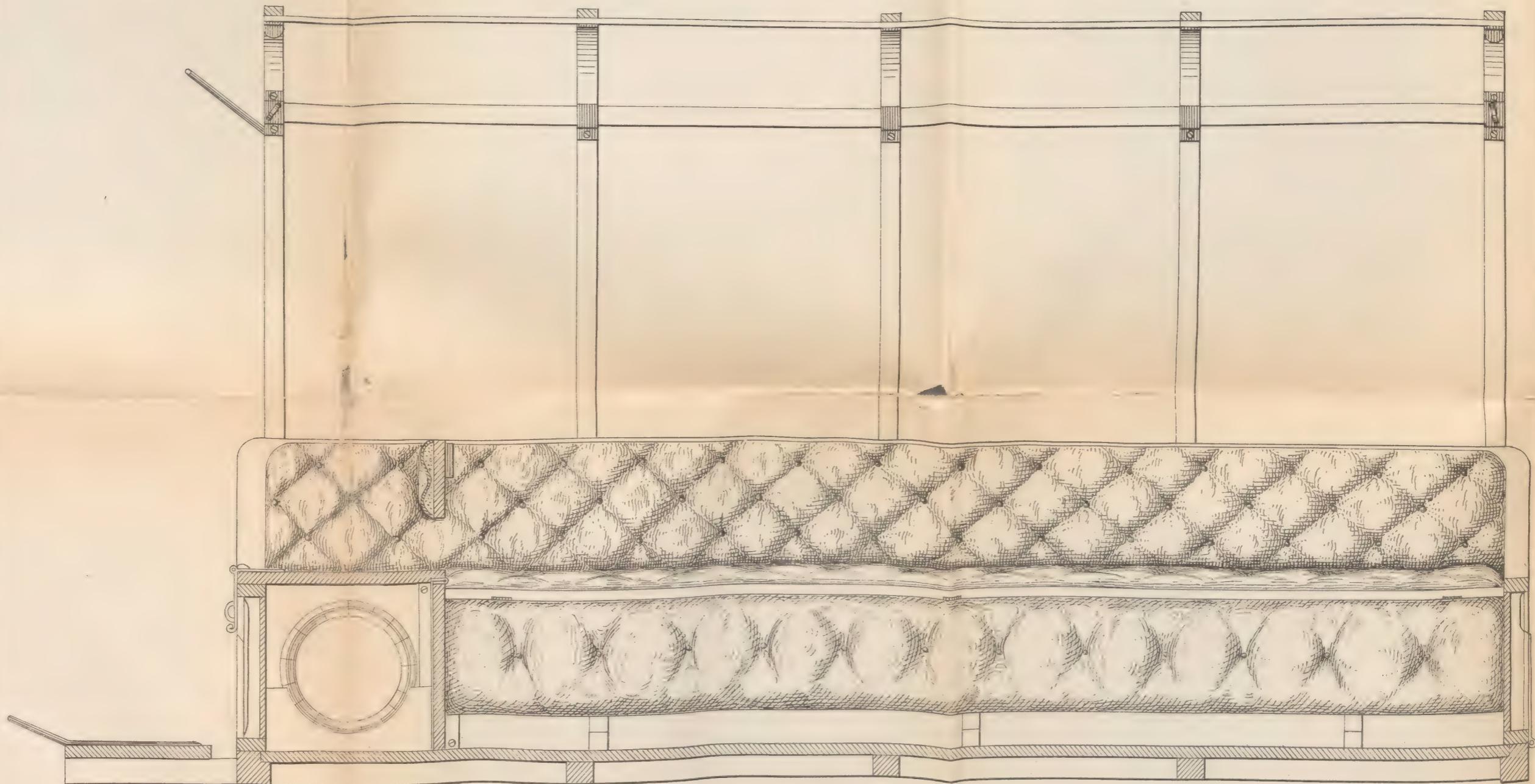
Rear Elevation

FULL SIZE ON ORIGINAL DRAWING IS 25 INCHES.

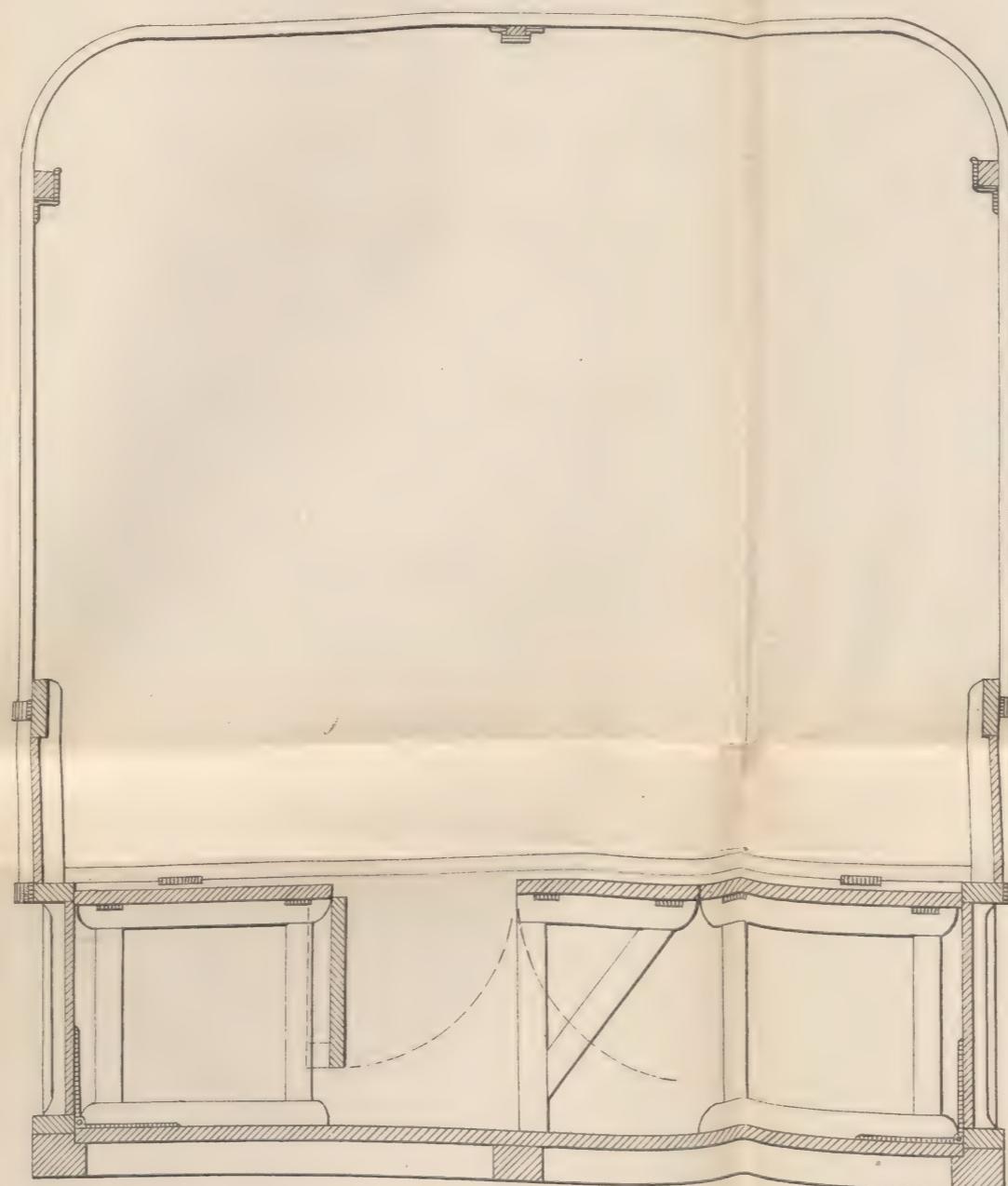
REDUCED IN PHOTOGRAPHING TO 17 $\frac{1}{2}$ INCHES.

Washington Ambulance





Vertical Longitudinal Section.



Transverse Section.

WASHINGTON AMBULANCE

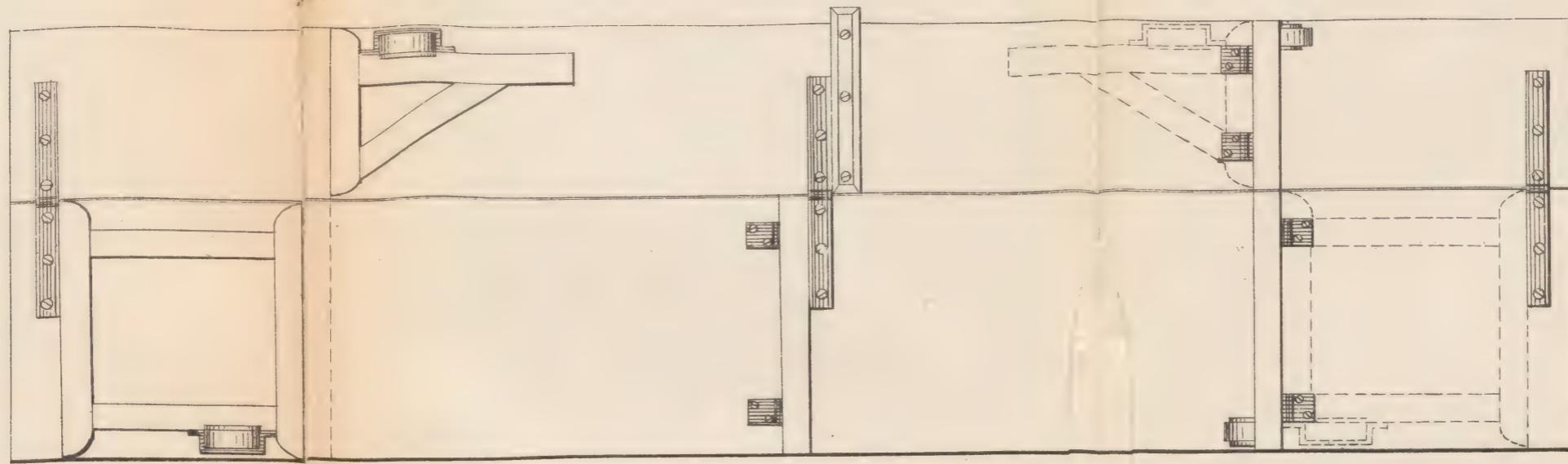
FULL SIZE ON ORIGINAL DRAWING IS $20\frac{1}{4}$ INCHES.

REDUCED IN PHOTOGRAPHING TO $18\frac{3}{4}$ INCHES.

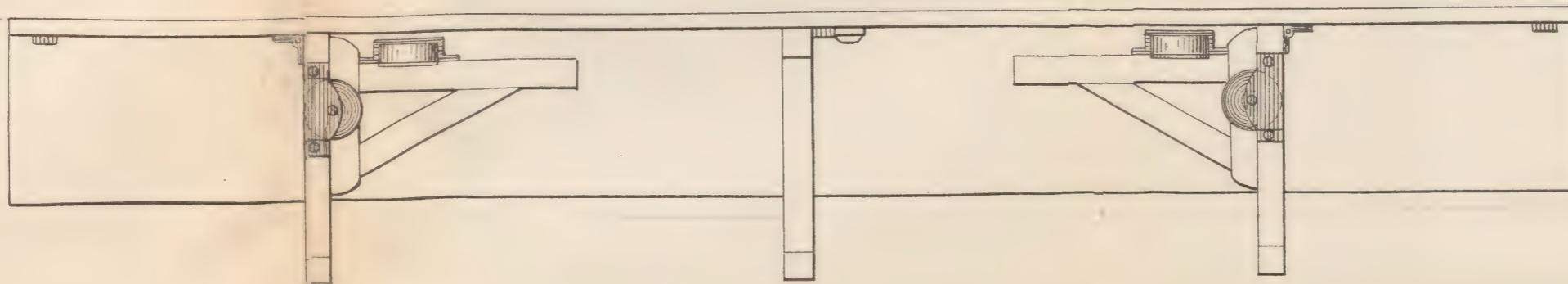
A



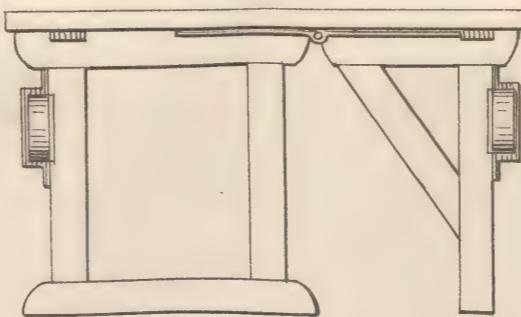
Plan of under surface of Litter.



Side Elevation.



End Elevation.

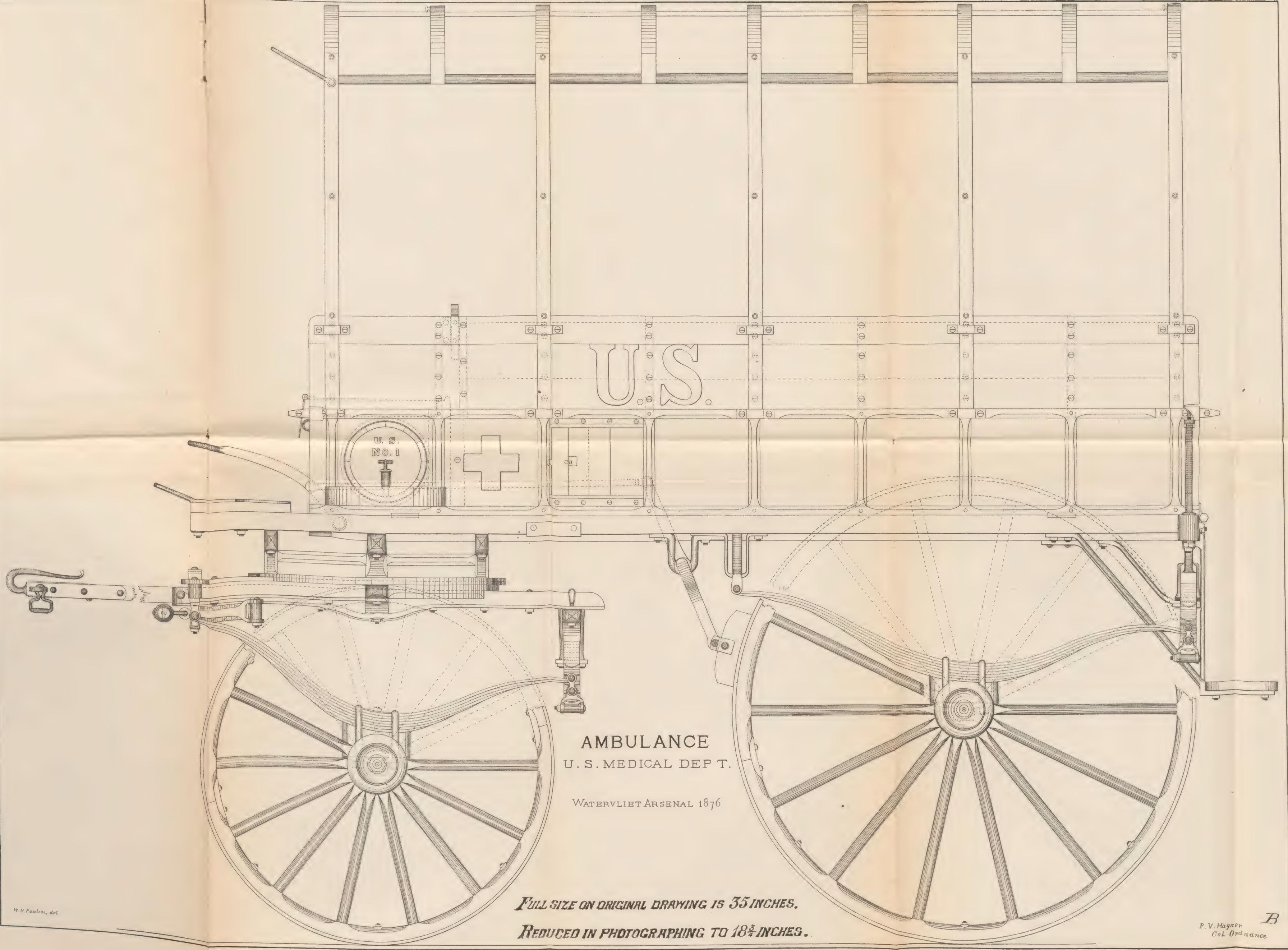


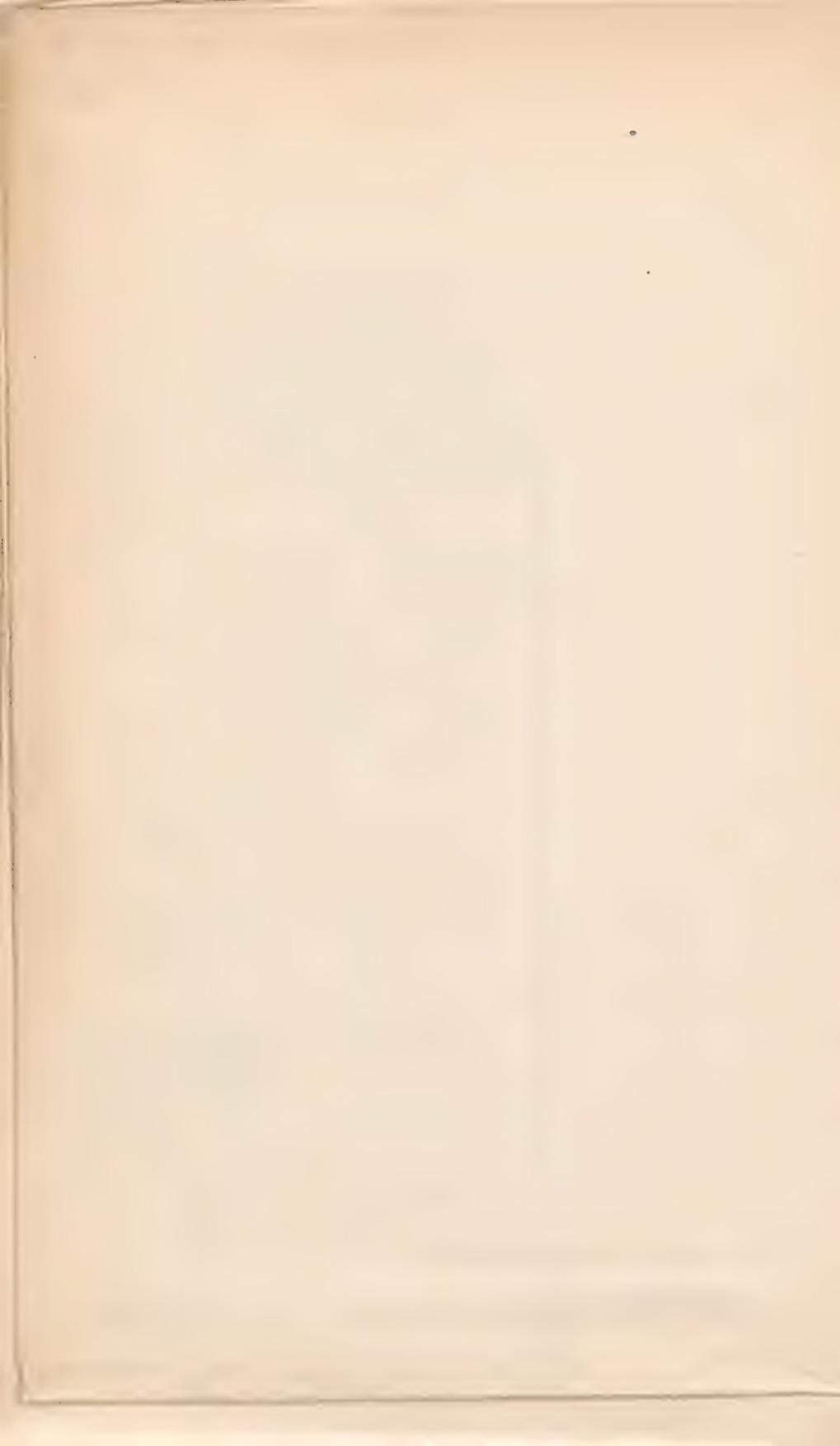
Washington Ambulance

Scale 1 $\frac{1}{2}$ in. to the ft.

A

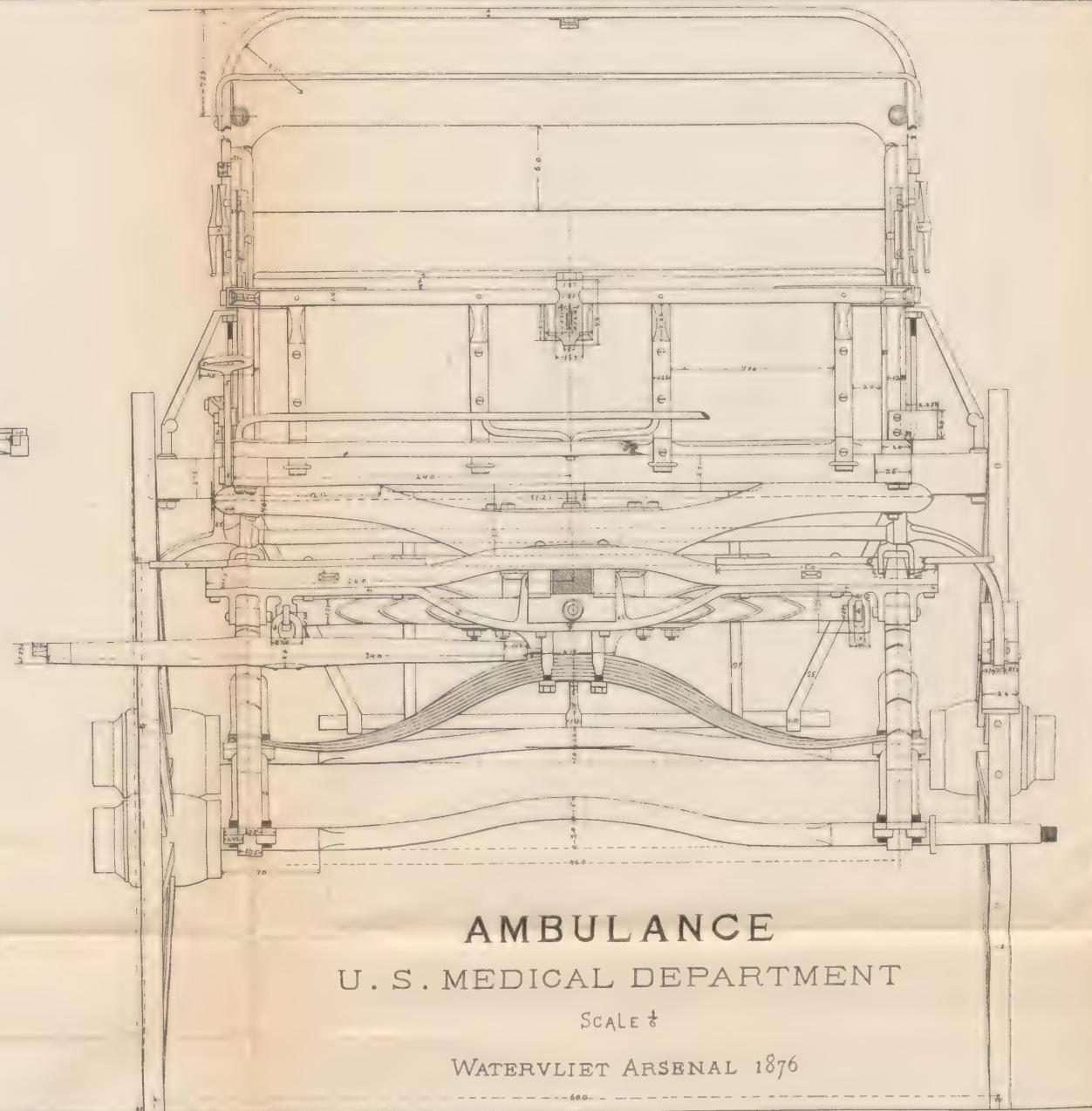
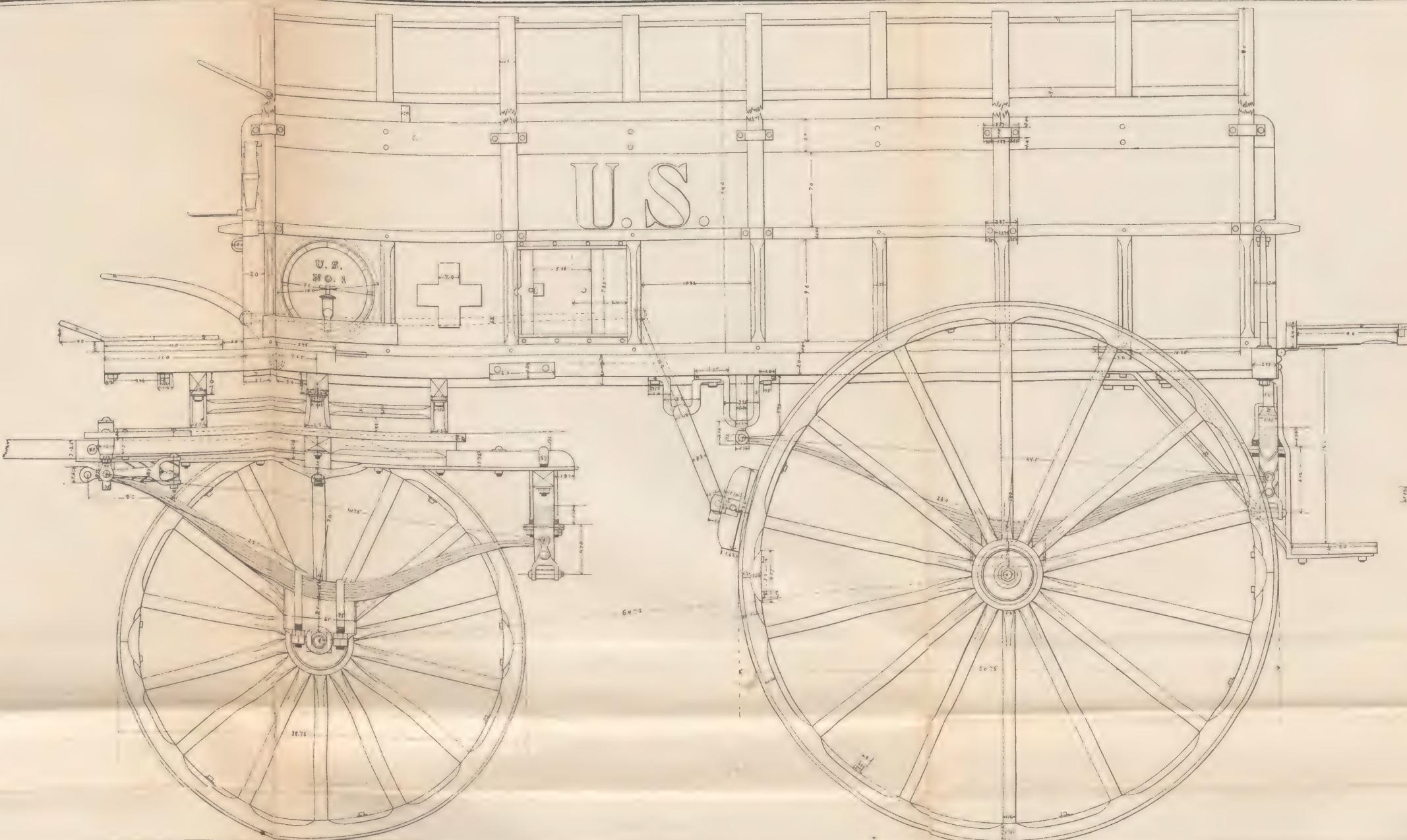
1



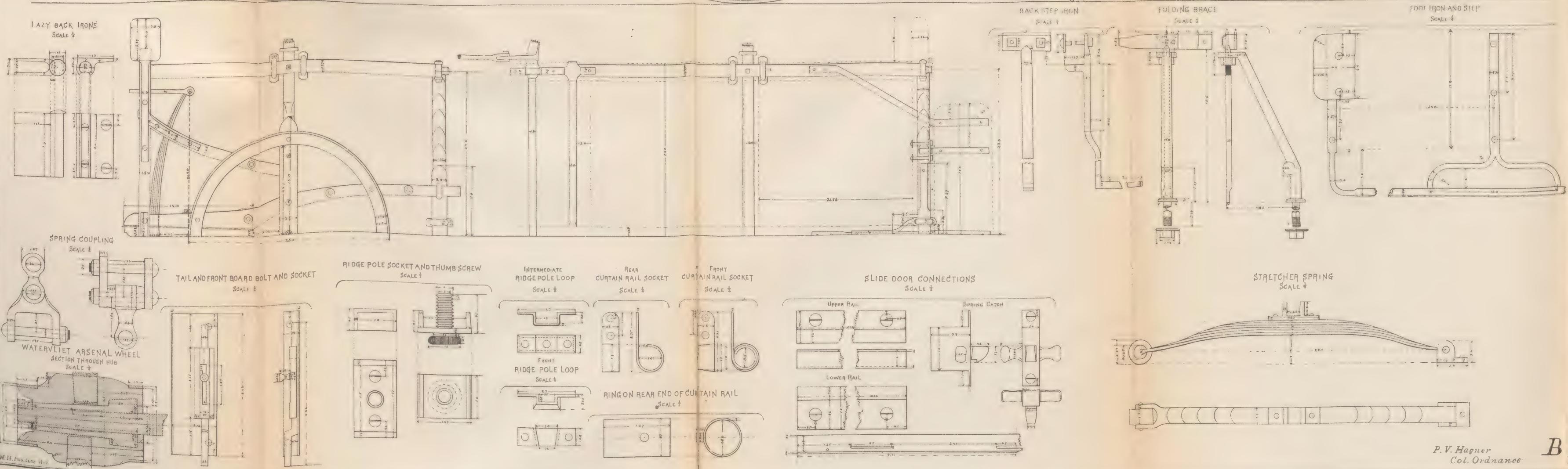


FULL SIZE ON ORIGINAL DRAWING IS 37 INCHES.

REDUCED IN PHOTOGRAPHING TO 18 $\frac{1}{4}$ INCHES.

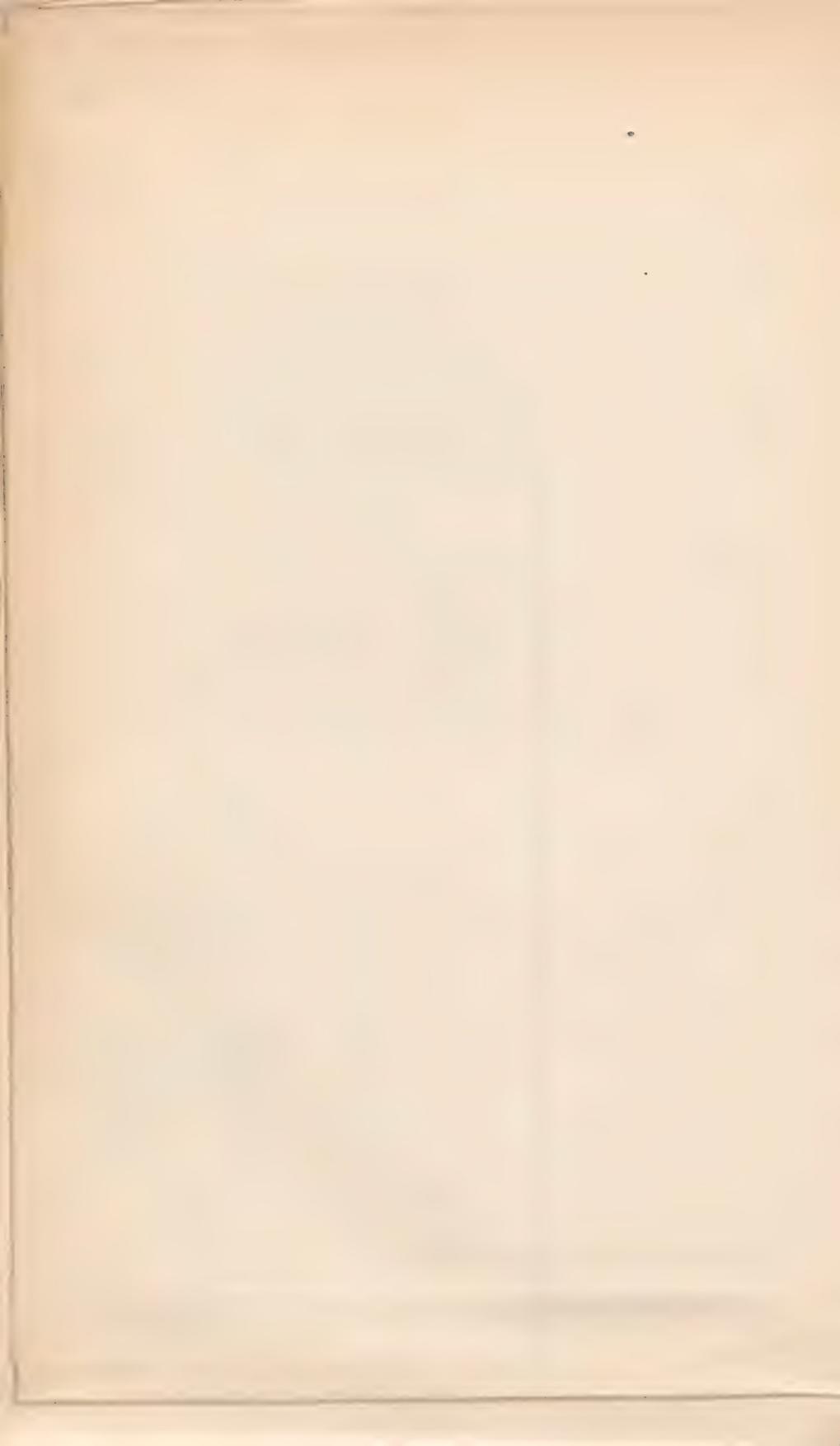


AMBULANCE
U. S. MEDICAL DEPARTMENT
SCALE $\frac{1}{4}$
WATERVLIET ARSENAL 1876

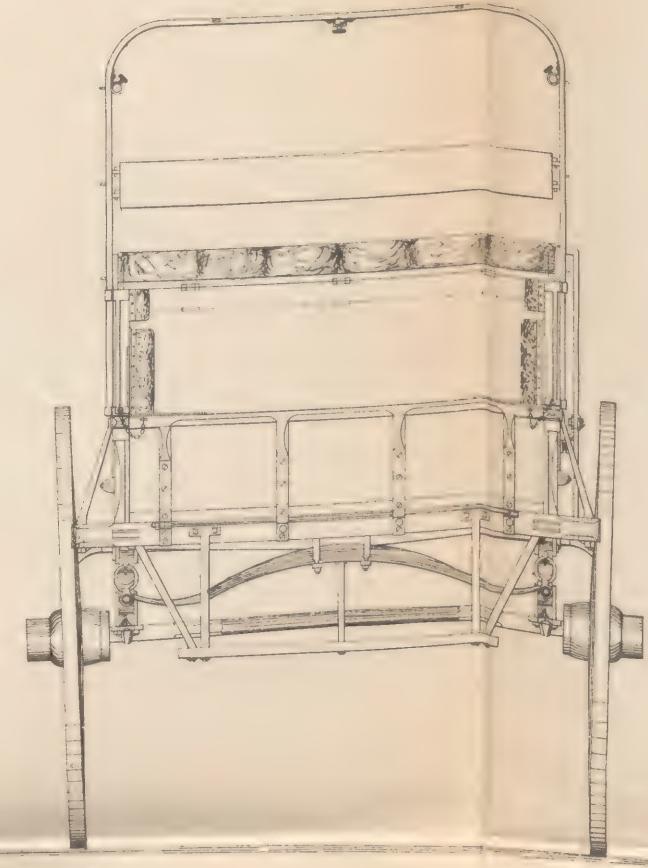


P. V. Hagner
Col. Ordnance.

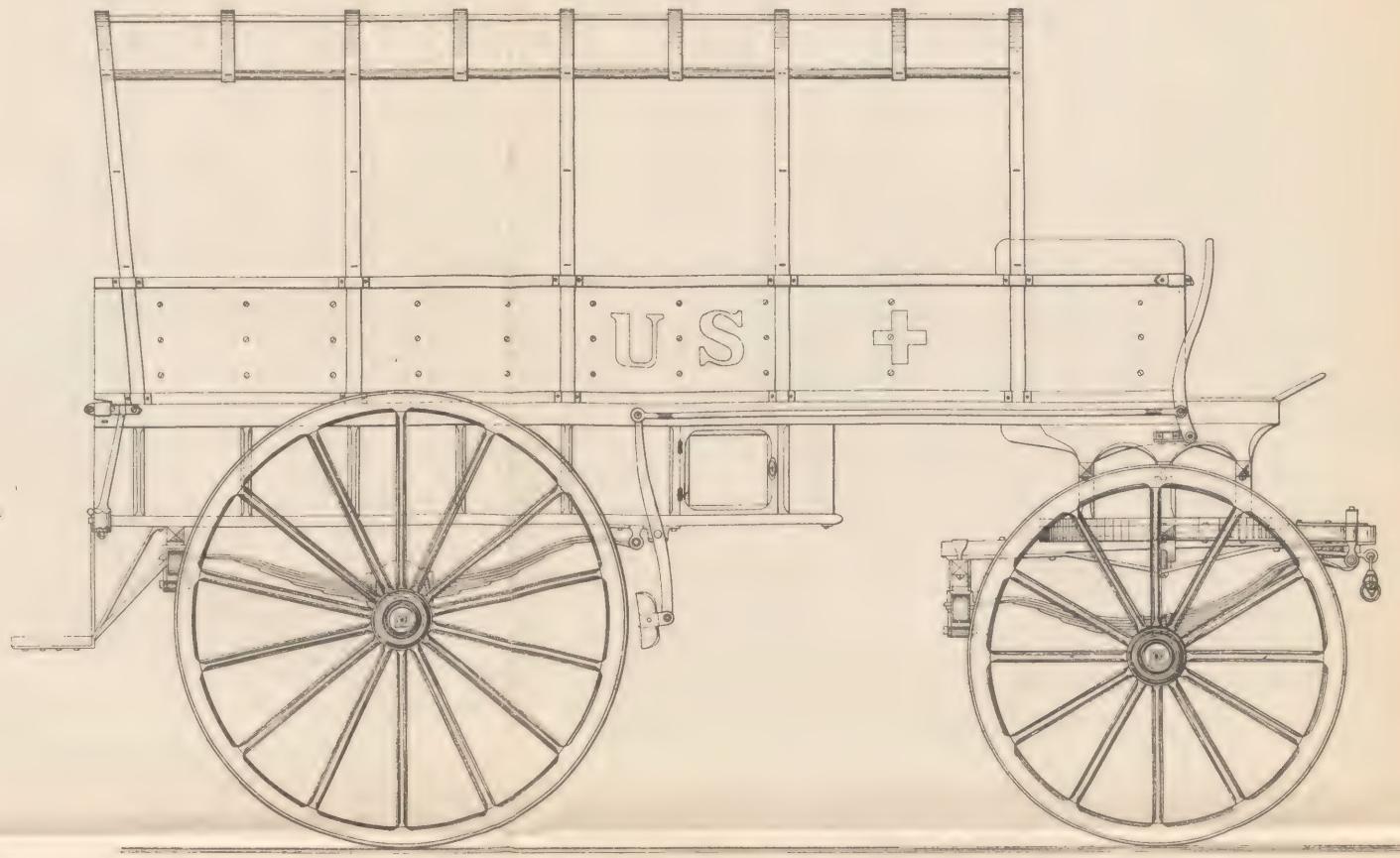
B



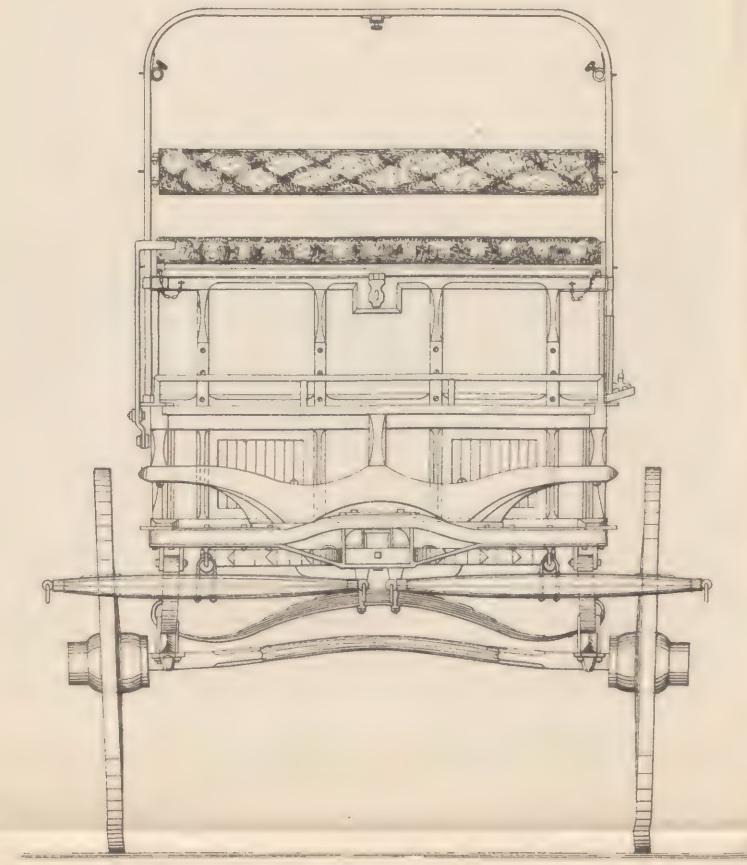
Ambulance Wagon U.S.Army



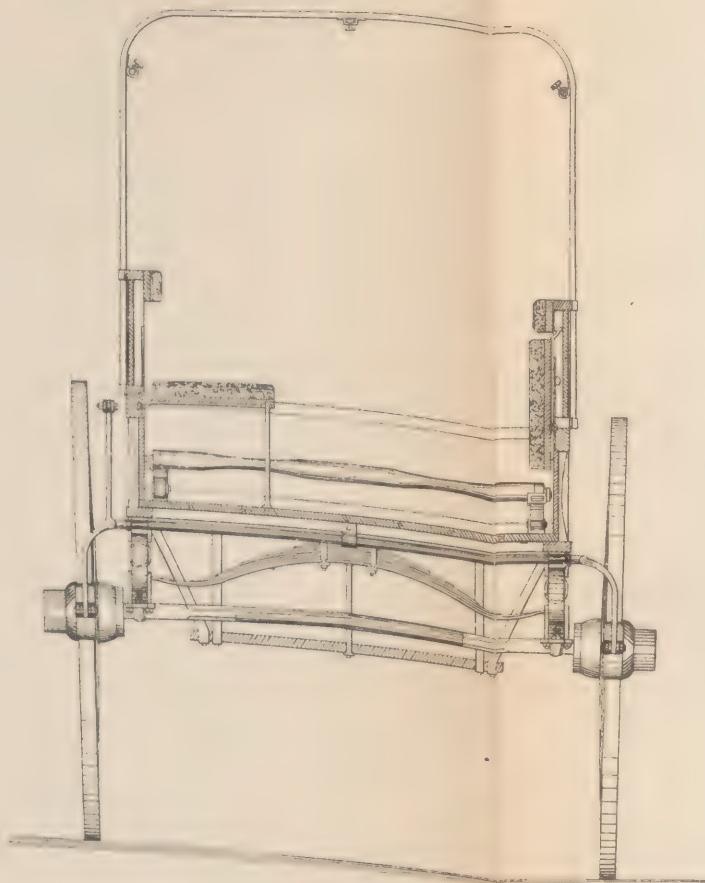
Back View



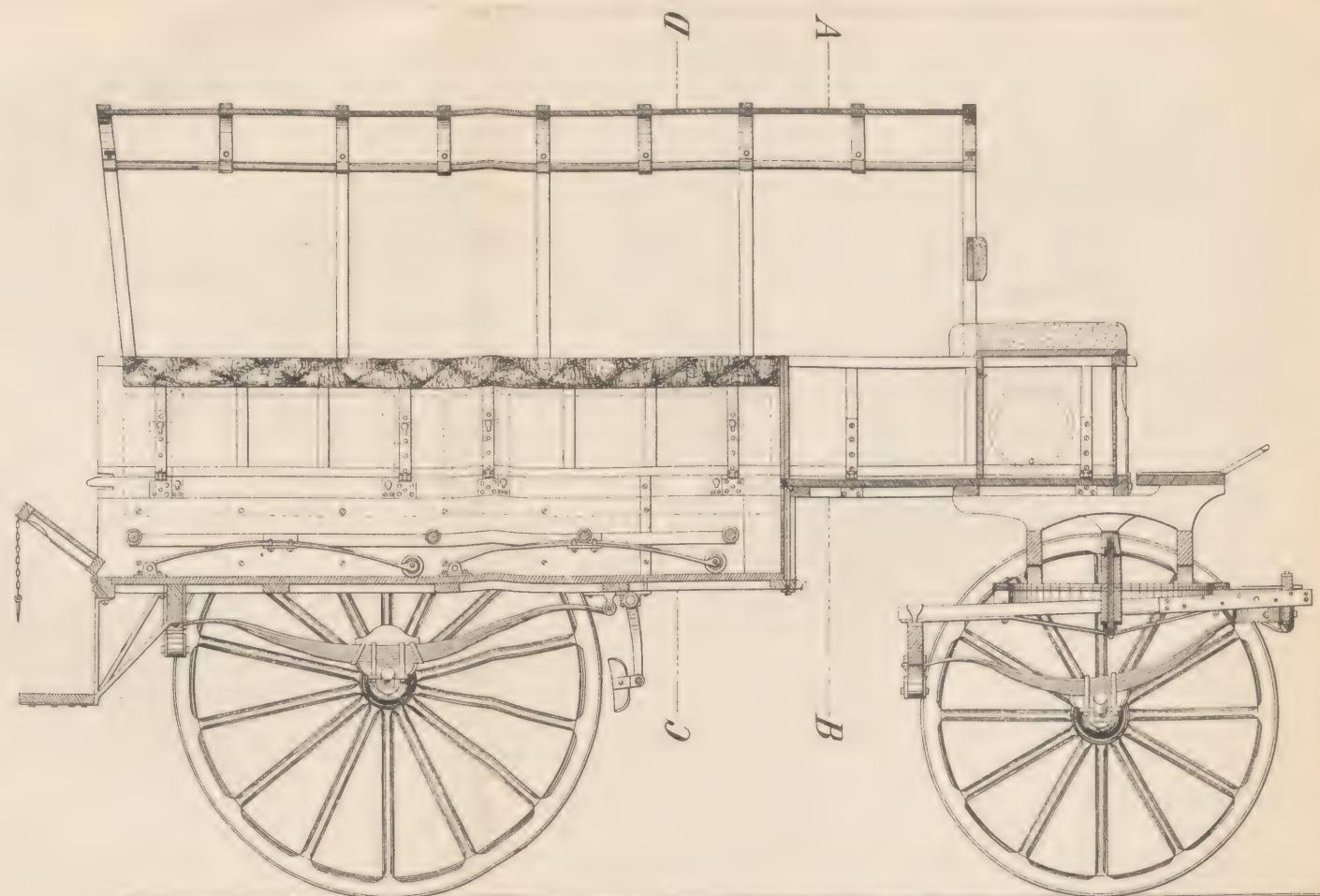
Side View



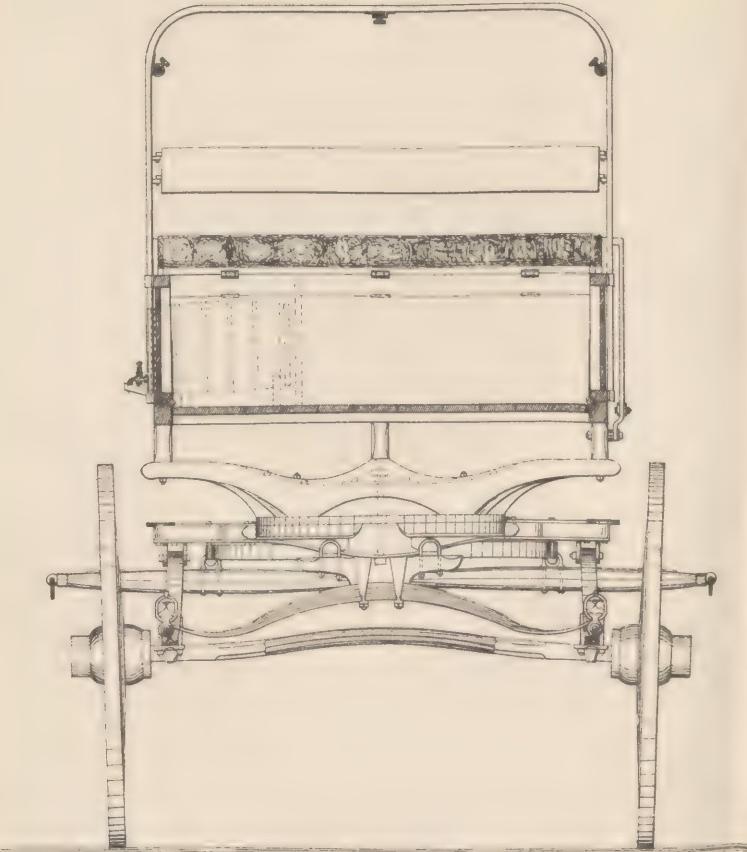
Front View



Cross Section
C—D



Longitudinal Section
through Center



Cross Section
A—B

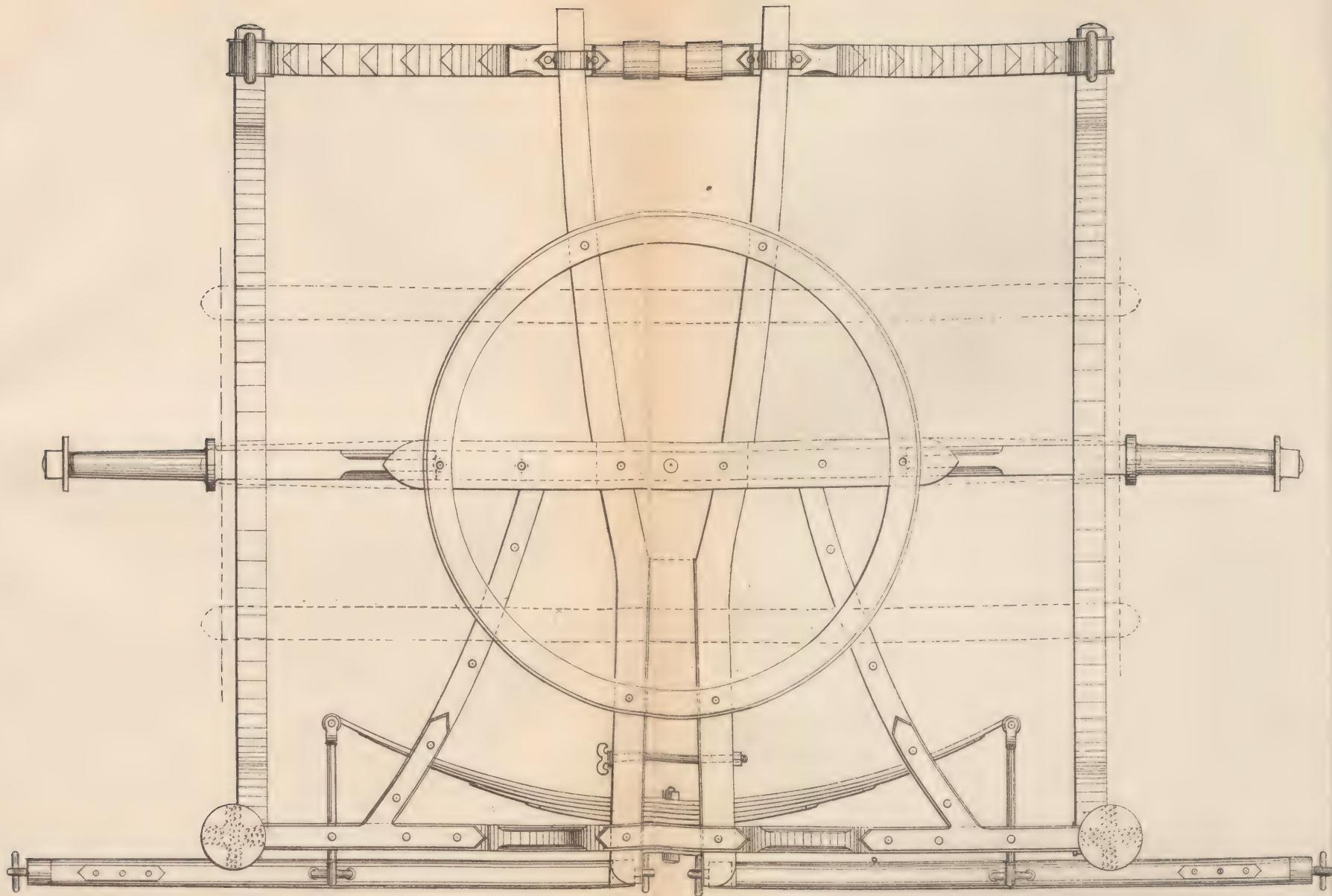
FULL SIZE ON ORIGINAL DRAWING IS 33 INCHES.
REDUCED IN PHOTOGRAPHING TO 18 $\frac{1}{2}$ INCHES.

C



Platform.

Scale: $\frac{1}{2}$ inch = 1 foot



Platform.

Scale: $1\frac{1}{2}$ inch = 1 foot.

C



JUN 24 1946

UH U56r 1878

62550190R



NLM 05099629 8

NATIONAL LIBRARY OF MEDICINE